Gas Journal

VOL. 292. 109th YEAR. LONDON, NOVEMBER 20, 1957. No 4923 PRICE 1/6

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DEC 6 1957
DETROIT

2 in every 5 tons of coal

carbonised

2

in Great Britain

=

are processed in plants

designed, built and serviced

5

by Woodall-Duckham

VISCO
STEELSHELL *Water Coolers*

FOR GASWORKS

In Gas Works, Steel Works, Cold Storage Plants and factories of all types, the world over, "Visco" Steel Shell Water Coolers have cut down the consumption of water used for cooling considerably. The saving is often as much as 97% compared with the use of Mains water used only once and then run to waste.

With "Visco" Steel Shell Coolers there is no waste as the water is recirculated continuously with a loss of only about 3% by evaporation.

The illustration shows two "Visco" Steel Shell Coolers each of 6,900 g.p.h. capacity, used for cooling gas condensers at the Point of Ayr Works of the Wales Gas Board. These units can be used together or separately as occasion requires.

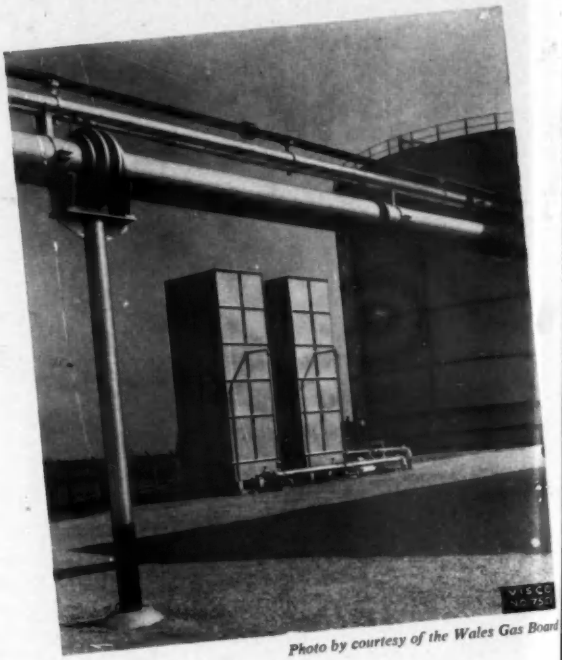


Photo by courtesy of the Wales Gas Board

We invite your enquiries for water cooling equipment for all purposes

Phone: Croydon 4181

VISCO ENGINEERING CO. LTD. STAFFORD RD. CROYDON

THE *Linton* HIGH PRESSURE GAS SERVICE REGULATOR

This regulator is of a new design developed for mass production by modern methods, which allow seven main types of regulators to be produced, covering a very wide range of individual requirements, but utilising generally the same main components.

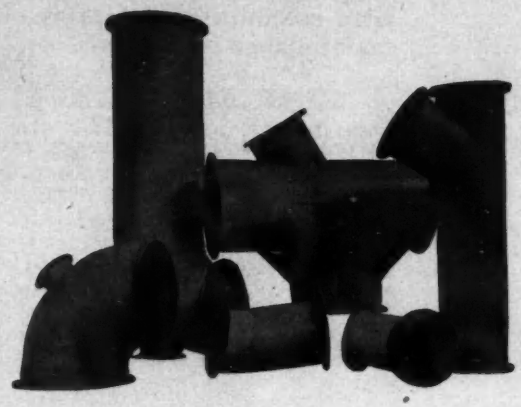
The regulator is suitable for controlling the gas supply to domestic premises from high pressure mains, or low to medium or high pressure mains.

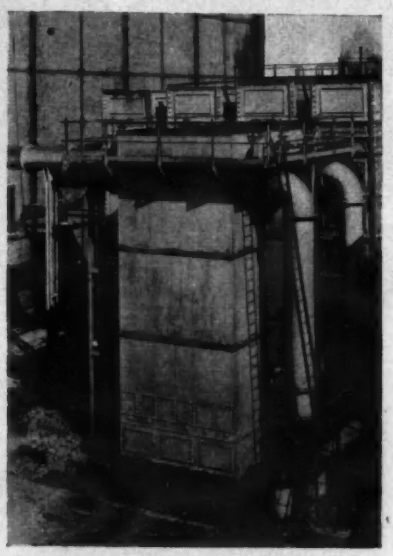
FULL DETAILS ARE GIVEN IN OUR PUBLICATION G/81.

THE BRYAN DONKIN CO. LTD.

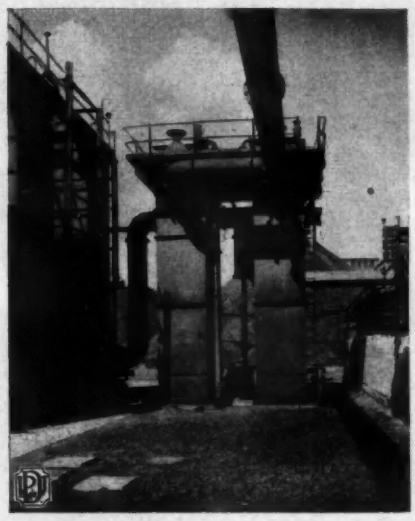
LINCOLN WORKS — CHESTERFIELD. 3, VICTORIA ST. WESTMINSTER S.W.1

SUITE 101. 217, BAY STREET. TORONTO — CANADA





The hallmark of high quality plant



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by DEMPSTERS of MANCHESTER

Our welded steel products include :— BY-PRODUCT and CHEMICAL PLANT : CONDENSERS : DETARRERS : GASHOLDERS : PURIFIERS : STILLS : TANKS : WASHERS, etc.

Our available services also include facilities for the thorough examination of welding by means of X-rays, and the use of isotopes for gamma ray testing where necessary.

Your enquiries and orders will be welcomed by :—

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Constructional Gas and Chemical Engineers

MAKERS OF HIGH QUALITY
BY-PRODUCT and CHEMICAL PLANT - CONDENSERS - DETARRERS - GAS CONNECTIONS and VALVES - GASHOLDERS - IRON CASTINGS - PURIFIERS STILLS - TANKS - WASHERS - WELDED and RIVETED STEELWORK

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MANCHESTER 10

Telephone : COLlyhurst 2554, 5 & 6
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Telephone : ABBey 4426 Telegrams : "Scrubber, Sowest, London"

THE OLD WAY

Automation in Purification

THE WASSER TOWER PURIFIER

introduces a new design into this Country. The ... combines comparatively low initial cost of instal... with reliability in working. It is simple to operate ... maintenance charges are reduced to a minimum.

SOME ADVANTAGES OF THIS SYSTEM

- ★ EACH TOWER CONSISTS OF A STACK OF WELDED STEEL TRAYS ... OUTER CASING OR BRICKWORK ARE REQUIRED.
- ★ EACH TRAY IS OF ROBUST CONSTRUCTION. THERE ARE NO INTE... STIFFENERS TO INTERFERE WITH THE PURIFYING MATERIAL.
- ★ ARRANGEMENTS MAY BE MADE FOR UPWARD OR DOWNWARD ... SPLIT FLOW OF GAS THROUGH THE PURIFYING MATERIAL.
- ★ COMPACT ARRANGEMENT OF GAS CONNECTIONS AND VAL... BOTTOM OF EACH TOWER GIVING ADEQUATE PROTECTION ... FROST.
- ★ RUBBER SEALING RINGS BETWEEN TRAYS ENSURE GAS TIGHT... NO WATER SEALS ARE REQUIRED.

THE NEW WAY

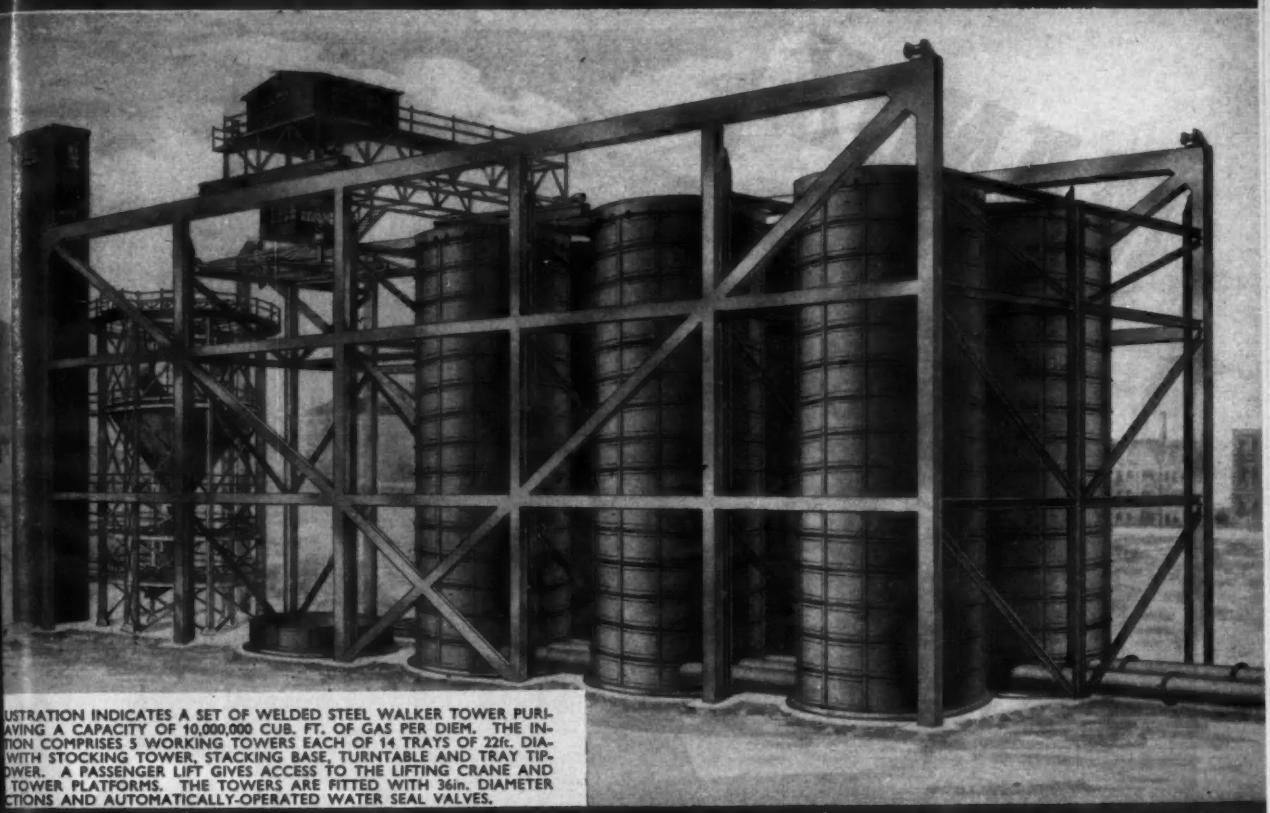
- ★ WATER VALVES ARE USED FOR GAS CONTROL, WHICH ARE POSITIVE IN ACTION.
- ★ RECORDERS SHOW FUNCTIONING OF WATER VALVES.
- ★ WATER VALVES ARE OPERATED BY REMOTE CONTROL, OR ALTERNATIVELY THEY MAY BE DIRECTLY OPERATED.
- ★ PROVISION IS MADE FOR EASY CLEANING OR REPLACEMENT OF ESSENTIAL WORKING PARTS.
- ★ A SPECIAL INDICATOR FITTED TO THE TABLE OF THE CONTROL PANEL SHOWS THE POSITION OF THE TOWERS IN THE GAS STREAM AND ENABLES THE NECESSARY VALVE CHANGES TO BE MADE IN THEIR CORRECT ORDER WHEN SWINGING THE PURIFIERS.
- ★ ANY ONE OR MORE TOWERS CAN BE BYPASSED OR NEWLY CHARGED TOWERS BROUGHT INTO THE GAS STREAM.
- ★ EACH TOWER IS TESTED TO 80" W.G. AIR PRESSURE BEFORE BEING PUT INTO COMMISSION.

This system of tower purifiers provides a neat streamlined appearance in keeping with the m... trend. The control panel may be situated in an office any distance from the purifiers. All ... operations are effected by turning switches on the control panel. The devices for valve oper... and recording as well as the switch gear are all standard types of equipment which have been ... tried out in other fields of engineering before being selected for use in connection with the W... system of tower purifiers.

ASK TO SEE THE PROTOTYPE TOWER TRAY AND THE DEMONSTRATION VA...

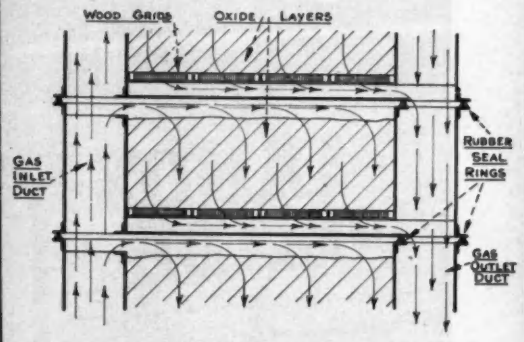
...AT OUR WORKS AT DONNINGTON, SHROPSHIRE

THE WALKER TOWER PURIFIERS



USTRATION INDICATES A SET OF WELDED STEEL WALKER TOWER PURI-AVING A CAPACITY OF 10,000,000 CUB. FT. OF GAS PER DIEM. THE IN-TION COMPRISES 5 WORKING TOWERS EACH OF 14 TRAYS OF 22ft. DIA-WITH STOCKING TOWER, STACKING BASE, TURNTABLE AND TRAY TIP-OWER. A PASSENGER LIFT GIVES ACCESS TO THE LIFTING CRANE AND TOWER PLATFORMS. THE TOWERS ARE FITTED WITH 36in. DIAMETER CTIONS AND AUTOMATICALLY-OPERATED WATER SEAL VALVES.

fiers may be arranged in one line or, alternatively, in two lines as shown in the above illustra-, depending upon the ground space available. An oxide plough may be substituted for the tray ng apparatus, in which case the trays are each fitted with a centrally placed discharge shoot cilitating the removal of the oxide.



TYPICAL SECTIONAL ELEVATION THROUGH A TOWER TRAY SHOWING DOWNWARD FLOW OF GAS THROUGH PURIFYING MATERIAL.
BRITISH PATENT NO. 712628.

TAIL OF A PORTION OF TRAY PARTLY FILLED WITH OXIDE IN ORDER TO SHOW ASSEMBLY TOP DUCTS AND GRIDS SUPPORTING THE PURIFYING MATERIAL.

Designed and manufactured to British Patents developed by:—

& W. WALKER LTD.

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DONNINGTON,
Nr. WELLINGTON, SHROPSHIRE.
Tel. No. Wellington, Shropshire 12

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MANOX OXIDE
FOR THE GAS INDUSTRY
The material offered is our own manufacture, and is of the following composition:—
Moisture ... ... 28% (loss on heating at 212° F)
45%-48% (Total Iron calculated as Fe. O. 3H.O on the dry basis)
Ferric Hydrate
The following allowances will be made in the case of any deviation from the above specification:—
For each complete 1% Moisture in excess of 28% 6d. per ton allowance.
For each complete 1% Ferric Hydrate less than 63% 6d. per ton allowance.
SPEEDIER DELIVERY
MANOX OXIDE
COL 1551
MANOX LIMITED
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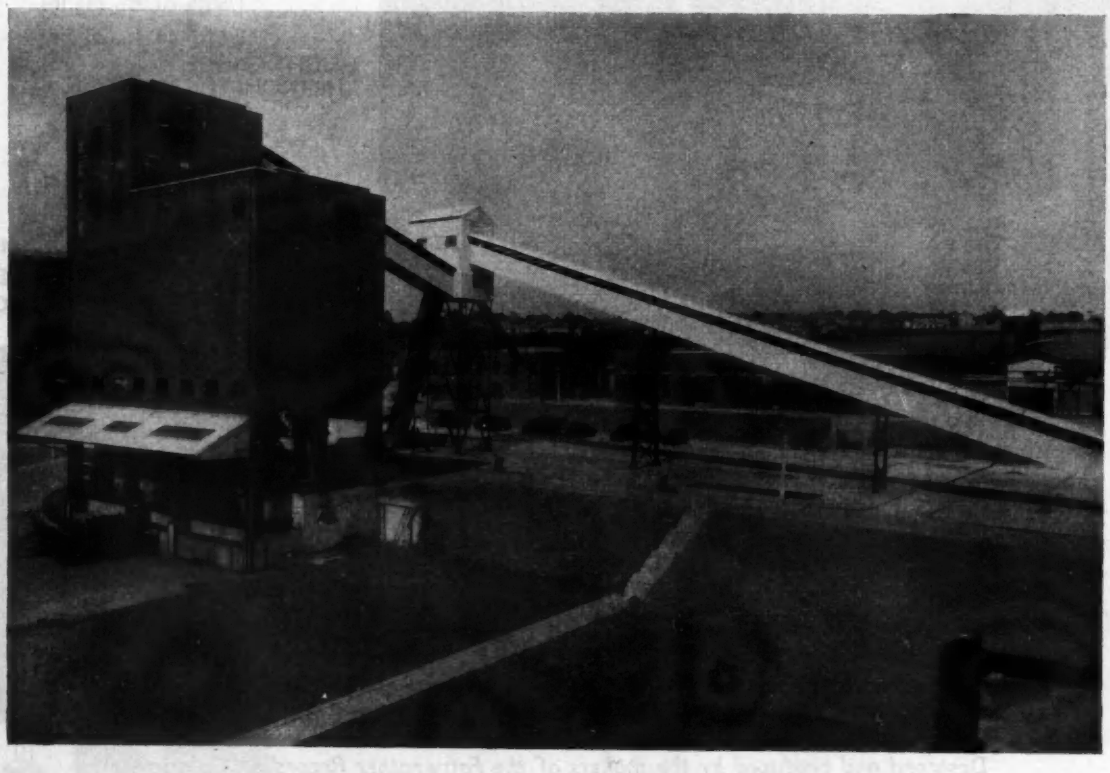
MANCHESTER 10
Tel. COLlyhurst 1551 (10 lines)
Grams. "OXIDE" MANCHESTER

DRAKES of HALIFAX LIMITED

COKE HANDLING & GRADING PLANT

Photograph shows:

Coke Handling and Grading Plant with 500 ton capacity Hoppers installed for the Southern Gas Board.



Photograph published by courtesy of the Southern Gas Board.

1847 D 1957

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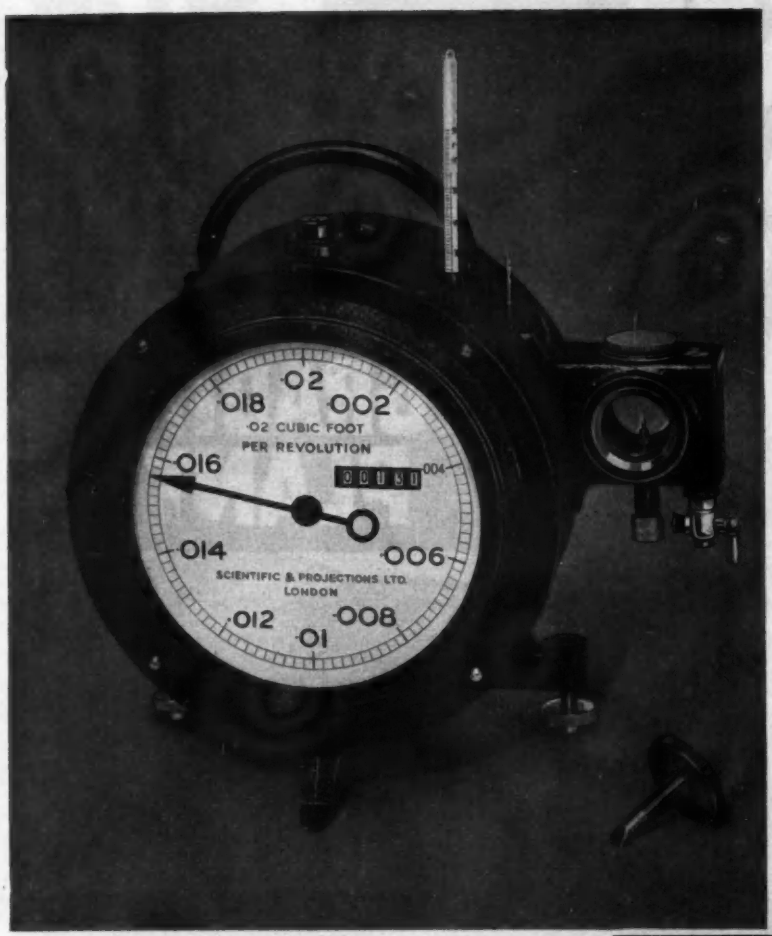
CONSTRUCTIONAL GAS ENGINEERS FOR MORE THAN A CENTURY

J.J.M.

The New Laboratory Test Meter, Mark II

(WITH "BUILT-IN" REVOLUTION COUNTER FOR ACCUMULATIVE READINGS)

Available in 1/50th, 1/10th & 1/12th, cu. ft. Sizes.



WITH REMOVABLE BACK AND FRONT. READILY DISMANTLED AND RE-ASSEMBLED, ENABLING PERIODIC SERVICING TO BE EASILY AND QUICKLY CARRIED OUT.

BODY AND DRUM IN SPECIAL-QUALITY STAINLESS STEEL THAT IS RESISTANT TO THE CORROSIVE EFFECT OF MOST FOUL GASES.

SPECIAL D-TUBE FITTING FOR REMOVING EXCESS MOISTURE.

IMPROVED SIGHT BOX.

MEASURING DRUM FINELY BALANCED TO ENSURE ABSOLUTE SMOOTHNESS IN ROTATION.

STRONG CARRYING HANDLE.

EASILY CARRIED: WEIGHT, WITH WATER CONTENT—

1/50th cu. ft., 14½ lbs.

1/12th cu. ft., 20 lbs.

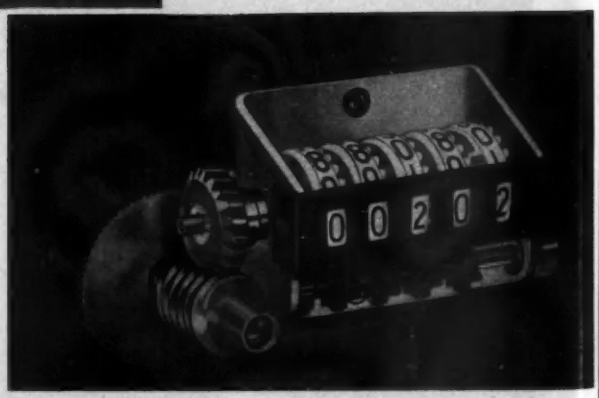
HEIGHT GAUGE.

THERMOMETER 30°-90° Fah.

WATER LINE ADJUSTMENTS CAN BE MADE WHEN METERS ARE IN NORMAL OPERATION.

The 1/50th and 1/10th cu. ft. sizes can be supplied to read in direct terms of cubic feet to 3 decimal places: the black numerals of the revolution counter reading in cubic feet, and with red numerals for decimals, the final decimal place being determined by the dial pointer.

Revolution counter of advanced design, with stainless steel spindles running in oilite bushes, giving a frictionless movement and freedom from corrosion. Plainly visible numerals on light plastic discs.



Designed and produced by the makers of the Fairweather Recording Calorimeter.

Please send for illustrated leaflet.

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GOVERNMENT BUILDINGS · KIDBROOKE PARK ROAD · KIDBROOKE · LONDON S.E.

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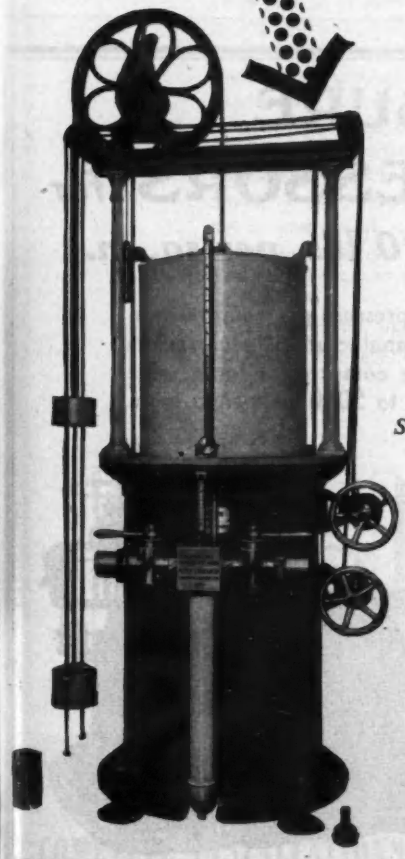
2 c.ft. Holder. Weight and cost is less than Standard Holders.

the standard of craftsmanship –



Test Holders by Alder & Mackay Ltd. have long been recognised, both at home and abroad, as the best. It is craftsmanship in their manufacture which ensures a precise balance through the whole scale—craftsmanship which is reflected in the building of every product of the company.

Standard Holders in 5, 10 and 20 c.ft. sizes.

—BY ALDER & MACKAY LTD

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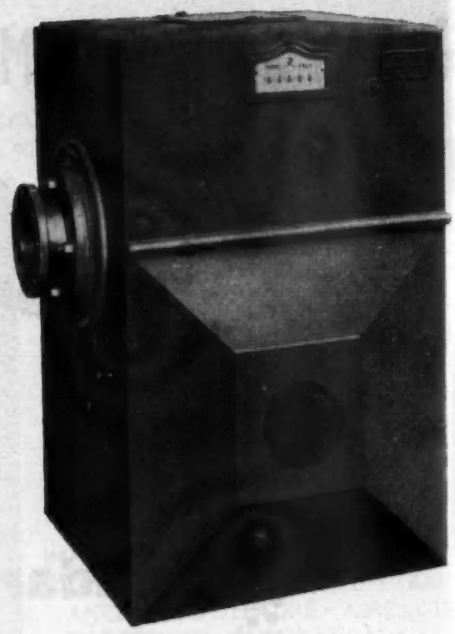
U·G·I GROUP

A NAME THAT REGISTERS

A.G.S

INDUSTRIAL GAS METERS



A comprehensive range of Meters in either large or small cases with capacities from 700 to 9000 cu.ft. per hour. Constructed from first-grade Staffordshire Charcoal Tinplates.

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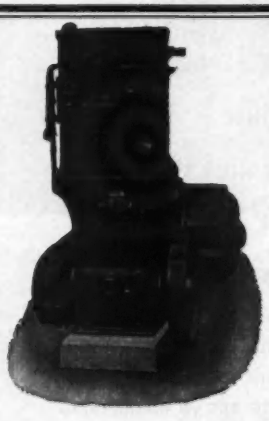
A. G. SUTHERLAND LTD.

WARWICK RD · GREET · BIRMINGHAM, 11

and at LONDON and NOTTINGHAM.

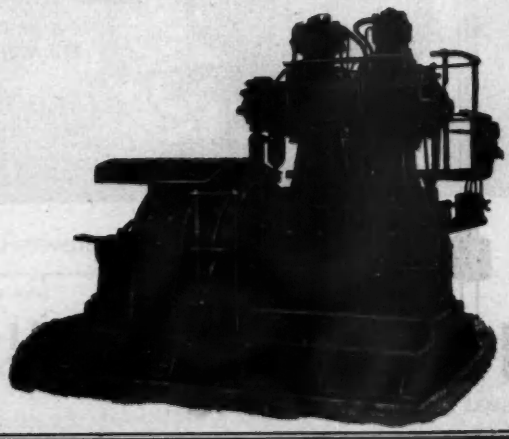


HIGH PRESSURE GAS COMPRESSORS for

pressures up to 5,000 lbs. per sq. in.

The illustrations show two high pressure gas compressors. As specialists in the design and manufacture of compressors for both air and gases, we make compressors for a wide range of capacity and pressure up to 5000 lbs. per sq. inch.

The compressor shown above has a capacity of 25 cu. ft. of free hydrogen per minute compressed to 3000 lbs./sq. inch. The illustration on the right shows a four-stage compressor with a delivered capacity of 200 cu. ft. of free town's gas per minute compressed to 5000 lbs. per sq. inch.



For full information regarding gas compressors, write, giving particulars of the duty required, to—

REAVELL & CO., LTD.

RANELAGH WORKS, IPSWICH

Telegrams: "REAVELL, IPSWICH." Phone No. IPSWICH 56124 (3 lines)

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Electronic devices are well-established for their valu in facilitating the control of apparatus where different units have to be interconnected or interlocked, and their timing altered, either automatically or manually, as conditions alter.

Such devices provide controlling 'signals': when it comes to providing *power* for actuation of apparatus or machines, hydraulic equipment is ideal, being self-lubricating, very accurately controllable, free from over-run and other undesirable inertia effects.

Similarly, the hydraulic equipment may be set in actior by a mechanical or manual signal, however weak. Hydraulic relays can be used to augment power to any desired extent, and peak loads may be met by hydraulic accumulators.

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All electrical or delicate mechanical apparatus may be remote from the heat, dirt, fumes and other harmful influences. Lockheed Industrial Hydraulic equipment is smooth-acting, self-lubricating and gives a long working life with the very minimum of attention.

For further details, please write for pamphlets and kindly mention this journal.

Lockheed

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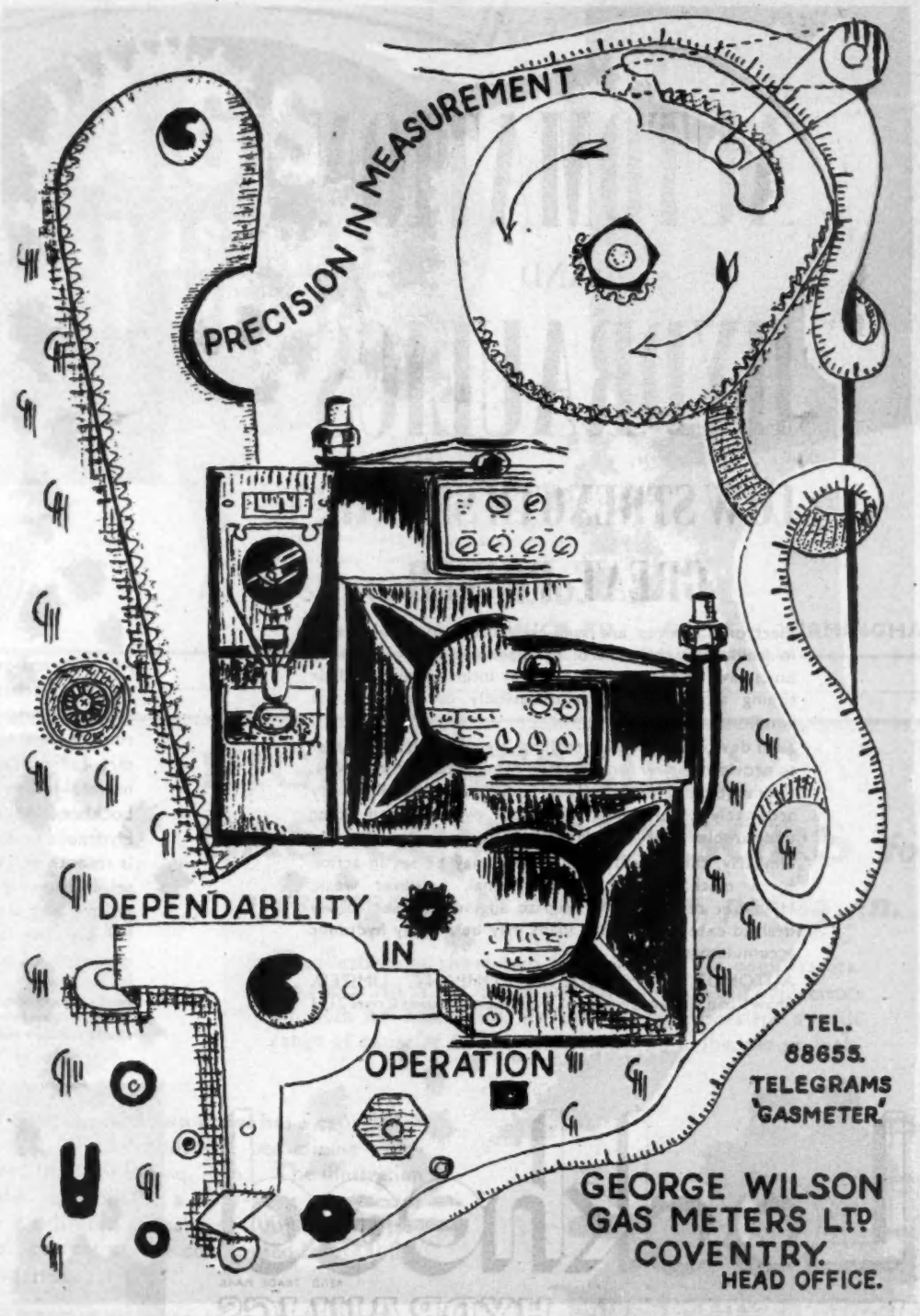
INDUSTRIAL HYDRAULICS

COMPLETE INSTALLATIONS BRITISH MADE OR INDIVIDUAL UNITS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GAS METERS LTD
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"WELL AND TRULY LAID"

MAINLAYING

Over 30 years' sound experience. Skilled and gas-minded workmen. Thousands of miles of mains have been laid by JEAVONS.

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measured breathing.....

How fascinating to watch the Rana Temporaria (frog to you!) — to see the sensitive pulsations of its pouch.

How interesting to make comparisons with that man-made breathing and measuring device — the modern gas meter. The movement of its diaphragms is equally sensitive .... but the leather itself is immensely more robust.

D. & G. L. Leathers are scientifically selected for thickness, non-porosity and strength, and are processed to give long and accurate metering anywhere in the world.

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LEATHERS FOR THE GAS INDUSTRY

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STACKERS & BAGGERS

'BIG WALRUS' Fully Mobile STACKER
★ *STACKS 120 TONS OF COAL PER HOUR!*

This C & T Stacker is Electric or Diesel operated. When feeding from usual Tipping Lorries, ramps are unnecessary, as opening in extra wide hopper permits direct access from the front at low level. Rubber sealing flaps around hopper opening and steel skirt-plates on belt to reduce spillage to negligible proportions.

MOBILE BAGGING UNITS
Speed Handling · Reduce Costs!

★ *CAN BAG AND WEIGH UP TO 12 TONS OF COAL IN 34 MINUTES!*

This C & T Junior Bagging Unit designed to handle 1 cwt. Coal Bags, can cope with pieces up to 8" max. size. The unit incorporates Electrically Vibrated Bagging Chutes giving fine control over material being bagged—a footswitch leaving the operators' hand free to hold bag.

Full particulars of these equipments from :

CRONE & TAYLOR (ENGINEERING) LTD.
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CLAYTON SON & CO. LTD.
HUNSLET LEEDS YORKSHIRE
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LEAK DETECTION

We provide a service for finding leaks in buried pipes quickly. Pipelines can be backfilled as laid, with the confident knowledge that should they not pass their test, the leaks can readily be found. The saving in expense compared with the old method of using ethyl mercaptan and the sense of smell, or digging up the line and going along with soap and water, is considerable. The technique is also applicable to aboveground lines or to plant, equipment, tubular heaters and condensers or any vessels which it is practicable to test by compressed air.

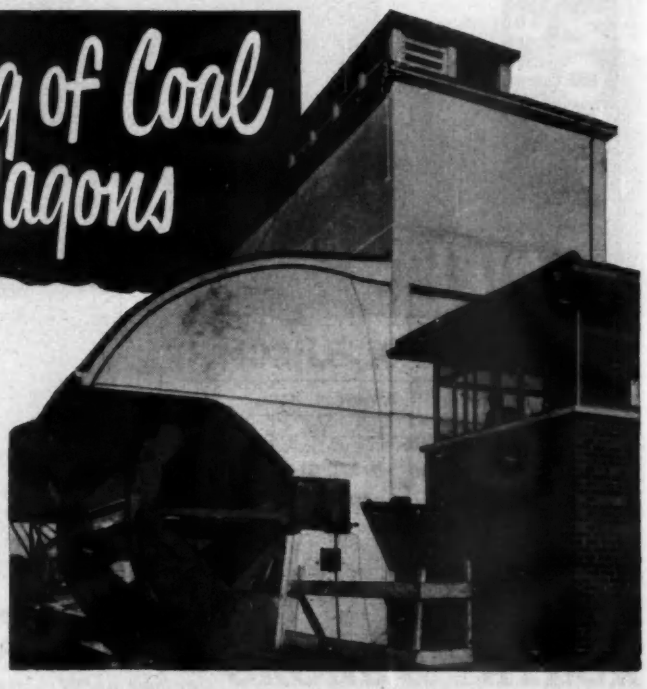
Further information will be gladly supplied on request.

MAPEL

METAL & PIPELINE ENDURANCE LIMITED

Leak Detection Division, Abbey Grounds, Abingdon, Berks. *Phone:* Abingdon 1414

Dustless tipping of Coal from Railway Wagons



by the

ROTASIDE TIPPLER

combined with the
Strachan & Henshaw
patented

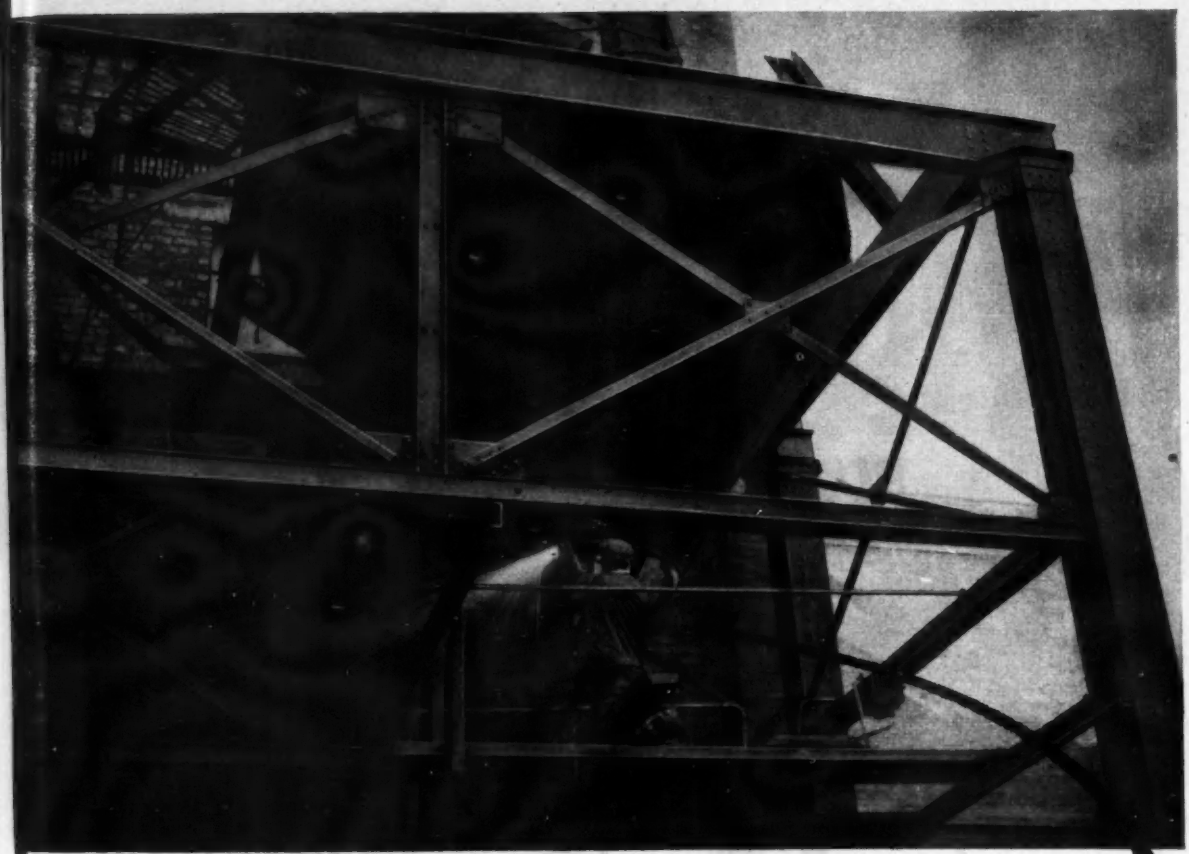
DUST TRAPPING SYSTEM

No Fans! No Filters!
Very little power required!

Full particulars from—

STRACHAN & HENSHAW LTD

STEELHOIST WORKS BRISTOL 2 *Telephone 78331*



Another Dismantling Job By T.W.W.

Skill in dismantling consists of tackling a destructive job in a constructive manner and in obtaining maximum recovery and re-use of plant and machinery. Above is a typical example of Wards at work dismantling equipment in connection with the removal of large boilers and generating plant. Whenever there is a dismantling job to be done it is good business to remember this aspect of the Ward Group service.

WARDS **WORKS DISMANTLING DEPT.**

THOS. W. WARD LTD · ALBION WORKS · SHEFFIELD · PHONE · 26311 EXT. 205

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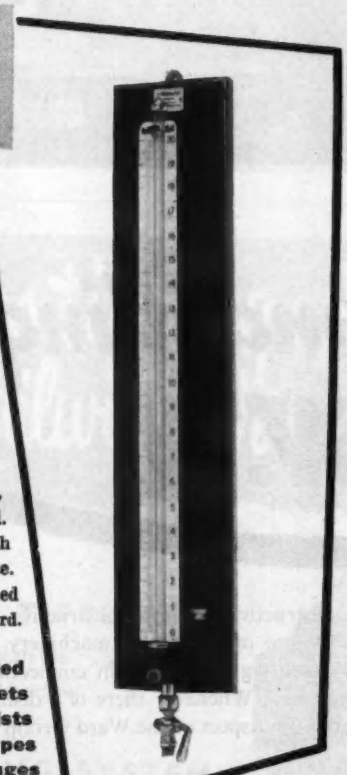
THORP

pressure gauges



For Pressure, Vacuum or Differential, water filling. For Mercury we can supply gauges similar to the above with iron bodies. Supplied in all ranges from 6" to 60" wg. Brass Body, polished or finished black crinkle, with Unions, etc., chrome plated. Ivorine Scale, depth engraved, on wood base. Mounted on Polished Mahogany Board.

Write for illustrated leaflets and price lists of all types of gauges

THOMAS THORP & CO LTD
WHITEFIELD Manchester

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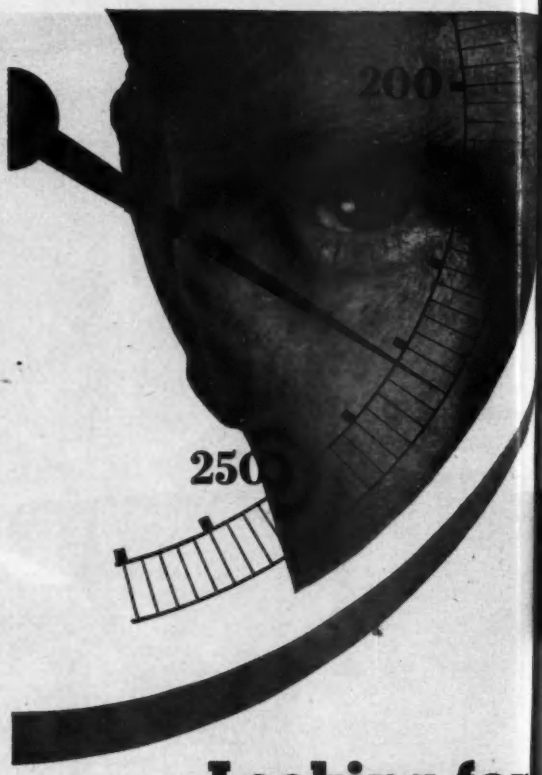

Looking for *cheaper* steam?

9 million tons of coal alone are wasted in Britain every year through inefficient boiler practice in industry. With fuel so costly, no steam user can afford to ignore economy. Rather let us try to generate a little more steam from every ounce of it, or, better still, from every B.T.U. of waste heat.

Senior Economisers do just that. By taking the valuable waste heat from the flue gases to preheat the feed water they can increase efficiencies by 5 to 15%. Due to their patented H-gilled heat exchange tubes and straight-through, vertical gas passages they combine high effective heat transfer with a minimum draught loss.

A Senior Economiser can be fitted to any type of boiler burning more than 20 tons of fuel weekly of any type. It would pay you to write for further details.

Senior H TUBE economiser *for cheaper steam*

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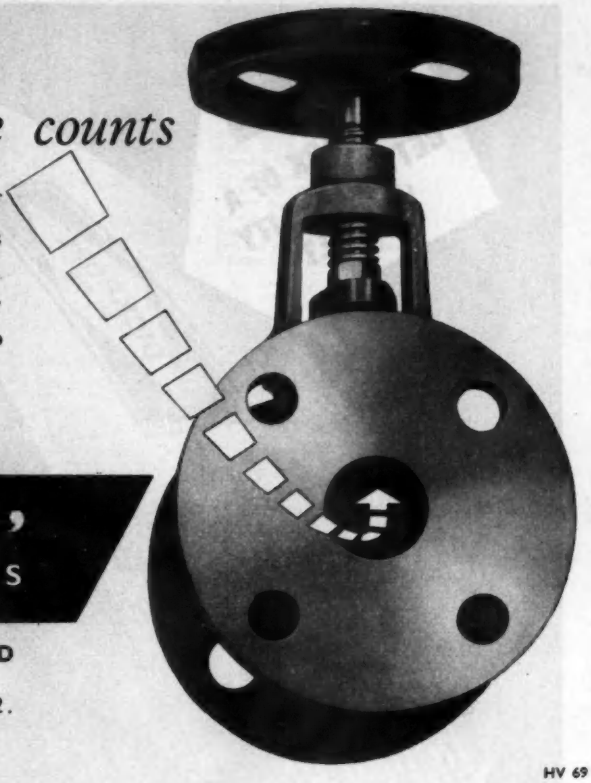
Telephone: Holborn 7643/4

It's in here where
Hopkinsons' experience counts

The same design-experience and excellence of materials go into Hopkinsons' Small Bronze Valves as into their big brothers for power station practice. The entire range is fitted with 'Platnam' alloy for the valves and seats giving a superior resistance to erosion and deterioration.

Write for Catalogue No. 951 for full details.



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SMALL BRONZE VALVES

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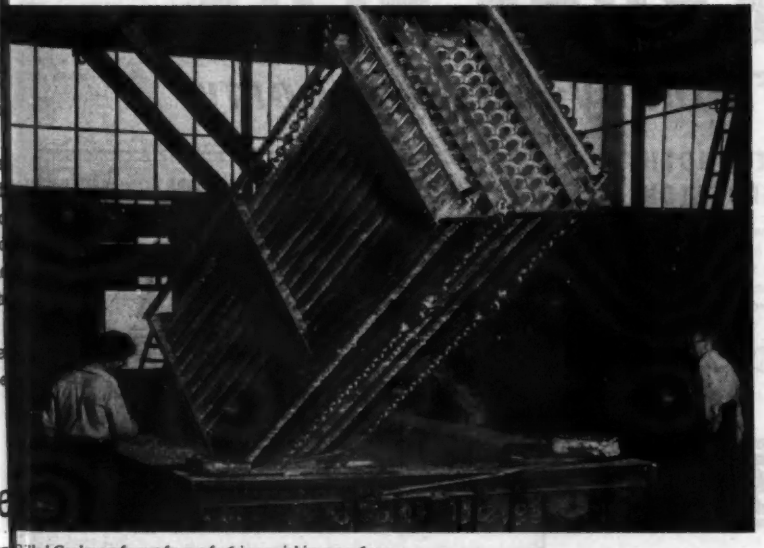

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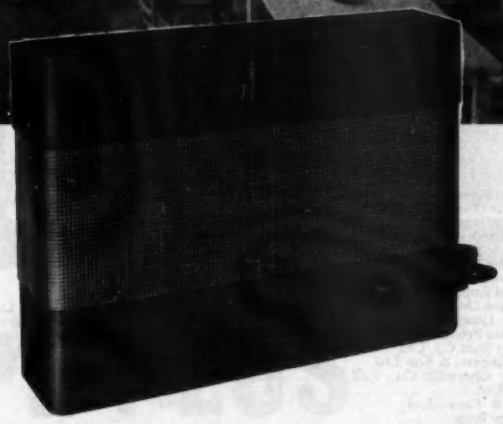

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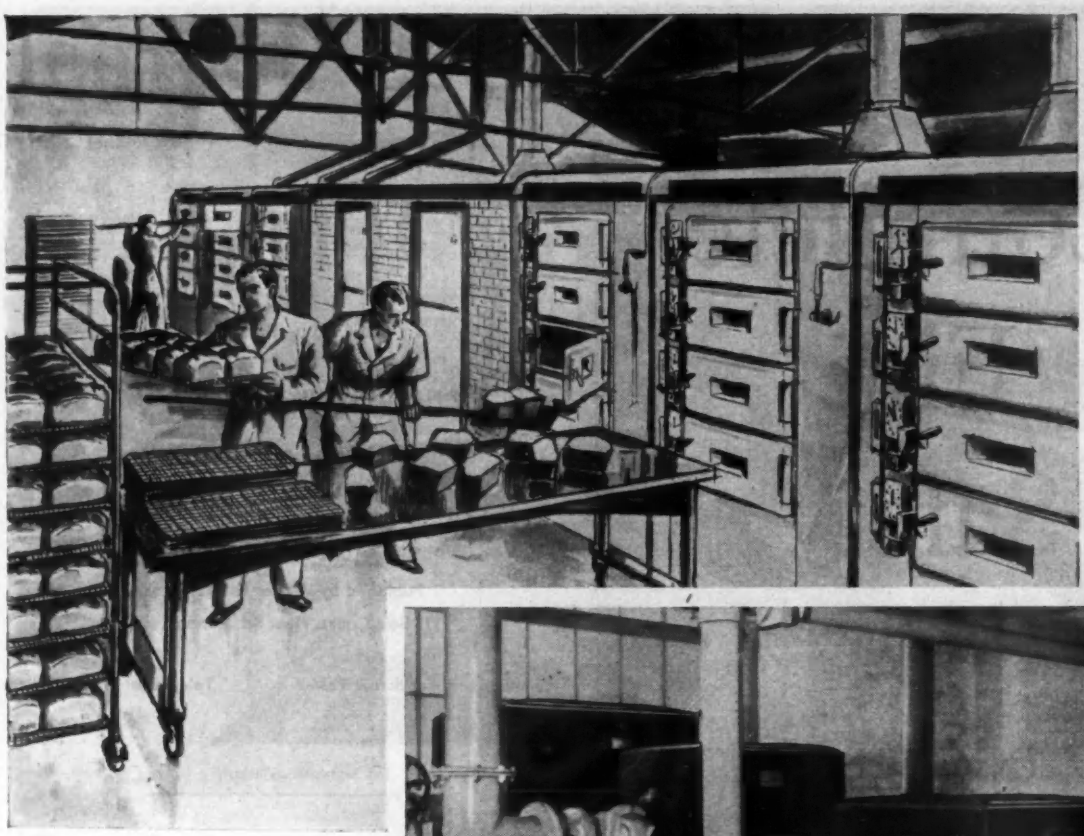

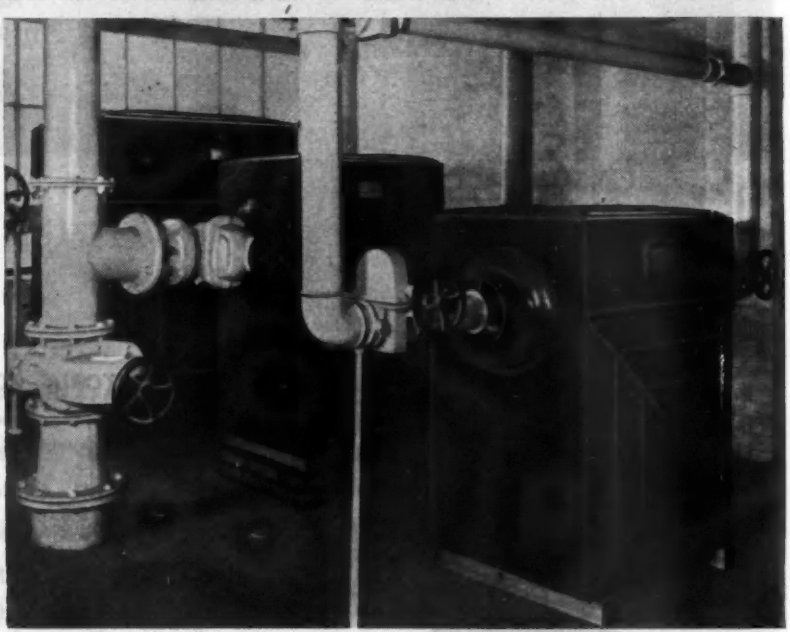

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Gas Journal

VOLUME 292. No. 4923. NOVEMBER 20, 1957. 109th YEAR

Coke Oven Gas and the Gas Industry

IT would seem at first sight that where the production of gas is concerned the two sister industries, the metallurgical coking industry and the gas industry, are in some cases duplicating each other's tasks. As long as the steel industry continues to flourish, the production of metallurgical coke at the highest possible output is essential, and since this type of coke is manufactured in a coke oven a quantity of surplus gas will result. The fact that there is a surplus of gas at all is the result of years of research into the design of the coke oven by the constructional firms, many of them on the Continent, in an effort to make it thermally more efficient. With the production of gas as the primary object, as in the gas industry, such a goal would have few disadvantages, since the firing of the carbonising plant is based on producer gas production which in turn influences the net production of coke. This can be kept under control by the production of carburetted water gas.

Where a coke oven battery is fired by rich gas (the coke oven gas produced in the plant itself) every successful effort to improve the thermal efficiency of the coke oven battery results in there being a greater surplus of the chief by-product, coke oven gas, which must be disposed of in some way. It can either be consumed at the coke works itself, by displacing some other fuel for steam raising or some other ancillary process, or it can be sold. The chief buyers, but it seems not the only buyers, of this surplus gas are the gas boards in the areas in which the coking plant happens to be situated. Here is a handy source of gas ready to be transported to the area board's grid system for distribution to its consumers. Naturally the area board is under legislation governing the supply of gas and has to make certain stipulations about the quality and characteristics of the gas supplied from the coking plant. These must be included in any contract that may be entered into. The variation in seasonal demand which the area boards have to contend with does not simplify the disposal of these large constant quantities of gas.

These and other difficulties were brought out in a paper read to a joint meeting of the Institution of Gas Engineers, the Coke Oven Managers' Association, and the British Coke Research Association by Mr. H. D. Greenwood. Mr. Greenwood spoke as a member of the coking industry and very ably put forward the many difficulties which confront both industries in the disposal of all the surplus coke oven gas in the country.

Undoubtedly coke oven gas, when available, should be used for the supply of base load gas while peak load demands should be met by special plant operated by the gas board, but the present trend in demand for gas is towards a rapid increase in the industrial load. This load is only effective during the week and is generally almost non-existent over the weekend and during industrial holidays. Unfortunately the coking plants are working continuously at the highest possible output, but the gas boards are physically incapable of storing or disposing of the surplus gas over periods of low demand. The coking plants must find some other outlet or reduce production in some way. Those coking plants at steel works can often reduce their gas surplus by using it for firing steel reheating furnaces normally fired by oil or tar, but the National Coal Board plants have few outlets for their gas other than the colliery boilers and may be compelled to flare it to waste.

If the coke oven plant has compound underfiring arrangements by which it can be heated either by rich gas or producer gas (which includes blast furnace gas) significant changes can be made in the volume of surplus gas available. Thus during periods of high demand the maximum amount of gas can be disposed of to the gas boards by underfiring with producer gas, but when the demand falls off, rich gas will be used for underfiring. Such an arrangement involves standby plant at the coke works but in a modern works purified gas of the correct calorific value is supplied direct to the gas board concerned. This is done by manufacturing a suitable producer gas diluent, so that the whole of the producer plant is not standing idle during periods of rich gas firing.

The cost of production of this alternative underfiring fuel will have its effect on the price of gas to the gas boards since coke is the main product of the works, but it seems that experiments in producer gas produc-

tion from low grade coal are being successfully carried out; in fact in the discussion that followed the paper, a fuel costing 2¼d. a therm was mentioned as becoming available shortly for this purpose. In this way then the surplus of gas may be controlled within certain limits, but from the standpoint of the full use of our indigenous resources and in the best interests of fuel economy why control it at all at the production end? There must be consumers in some part of the country who could make use of these surpluses with perhaps a slight decrease in price.

Of those boards which are near enough to coking plants to make full use of this gas, the Wales Gas Board is now buying 80% of the gas for its North and South Wales gas grids from coking plants, the Northern Board is taking all that it is offered, and the East Midlands Board is taking a large proportion. By the building of its 'backbone' main the East Midlands Board is successfully transporting large quantities of gas from Chesterfield to places as far south as Buckinghamshire as well as to the Lincolnshire Division. By using this very large area of consumption, the Board is able to balance its gas intake from several points so that the intake of coke oven gas is the last to be dispensed with at times of low demand. The inference that could be drawn from this might be that by building a national grid there need never be unwanted surpluses of coke oven gas. The base load for the whole of the United Kingdom could be found by the coking industry reinforced by suitable gas-making plans operated by the area boards.

In the discussion that followed several points emerged. The underlying theme seemed to be that some means could be found for taking far more surplus gas than was now being taken, but flexibility in the drawing up of contracts was essential and this could only be brought about, and the contracts made workable, by a complete mutual understanding of the outlooks of the two industries. It is so easy for the harassed coke oven manager at a big, modern coke works in a time of crisis to treat the production of gas as somewhat secondary to his main purpose of 'getting ovens pushed and charged.' This would hardly suit the gas industry. The two ultimate solutions would appear to be the building of a national grid together with some form of increased storage such as the underground system which is now being built by Gaz de France near Versailles.

Flashback on Coal Tar

THE installation by the Association of Tar Distillers of a coal tar exhibit in the Industrial Chemistry gallery of the Science Museum offers an excuse for probing into the history of this valuable product and the part it has played in the industrial progress of the country. Its use for the preservation of wood and cordage, particularly in the shipbuilding industry, is at least 200 years old. As far back as 1781 the Earl of Dundonald obtained his famous patent for the production of coal tar from beehive ovens and the subsequent fractional condensation of the tar vapours. It did not take long for the value of tar products as protective coatings to be appreciated and for the Earl to set up the British Tar Company to exploit the process. However, it was not until 1812 that the gas industry commenced large scale operation, and a steadily increasing production of coal tar resulted. Much of it was sold in the crude state, some was used as fuel for heating the retorts, and the remainder was distilled. In 1818, the first gas company—the Gas Light & Coke Company—set up a tar distillation plant at Poplar. A tar plant was set up, too, near Edinburgh in 1822, and from it Mackintosh obtained the coal tar naphtha he needed for his celebrated waterproofing process.

The first bulk demand arose in the use of creosote for the preservation of wooden sleepers required in large numbers by the extending railway networks. Pit-props were treated similarly, and tar distillation was undertaken on a more substantial scale. Coal tar pitch was first used for coal briquetting in 1842, and Perkin's discovery of the first aniline dye in 1856 gave rise to large demands for benzene. For some years developments in tar distillation were closely associated with those in the synthetic dyestuffs industry, and in 1864 Graebe and Leibermann prepared alizarin from anthracene, creating a demand for anthracene from tar.

Prior to the 80's only gasworks tar had been produced, but in 1882 the first battery of by-product coke ovens in Great Britain was installed, and the rise in coal tar output was subsequently accelerated. Developments in distillation technique took place, and in 1891 the Lennard pipe-still was introduced. Toward the end of the 19th century, following the discovery by Lister in 1865 of the antiseptic properties of carbolic acid, the tar acid fractions became important as the basis for disinfectants and deodorants. At the turn of the century, upon the introduction of motor transport, refined tar for surface dressing and in the manufacture of tarmacadam began its valuable contribution to the construction and maintenance of the British road system.

Of great importance in the present century has been the growth of the plastics industry, which dates from the original patent in 1907 of Baekeland on phenol-formaldehyde condensation, and in the various branches of this industry coal tar phenol, cresols and naphthalene are used in quantity. In recent years, especially during the two world wars, blends of pitch and creosote have become established as valuable liquid fuels, and the industry is continuing to supply large quantities of these fuels. We recall in particular how, during the Suez crisis, the tar distillation industry supplied considerable additional quantities of these fuels to the iron and steel industries to replace the cuts in petroleum fuel oils imposed at that time. During 1956, the quantity of crude coal tar distilled was about 2¾ mill. tons.

The exhibit which has been provided by the Association of Tar Distillers is designed to show to students and to the public, in the limited space available, the various processes, the type of plant used, and the galaxy of products which result from the distillation, etc., of coal tar. The quality of the models is apparent from the photographs published on a later page.

Underground Gasification Chiefs in U.S.S.R.

Russian Return Visit Here Next March

FIVE British experts flew to Moscow last Sunday for a fortnight's study of progress made by the Russians on underground gasification of coal. A reciprocal party of experts will be here from the Soviet Union next March.

Among the British party is Dr. A. E. Balfour, Deputy Head of the underground gasification department in Humphreys & Glasgow, Ltd., the firm responsible under the Board for the pilot scheme at Newman Spinney, near Chesterfield.

Britain began experiments in this technique in 1949, to produce gas from coal seams uneconomic to mine. The pilot plant is due to begin production by the end of next year.

Dr. Balfour said: 'We know the Russians have been working on underground gasification since 1935, latterly on a big scale.

What They Might See

'We do not know where we shall be travelling in the Soviet Union or what we are to see; the Russians are arranging the programme for us. The object of our visit now is to find out just how far they have got, especially with the technique using air. But we have three further interests.

'First we hope to see their work on directional drilling—the technique of accurate horizontal drilling over the considerable distances necessary for underground gasification.

'Secondly, we should like to know about their work on the use of oxygen. This offers the possibility of producing gas of a higher calorific value than can be obtained by using air; gas which might be suitable for use in town gas, or for synthetic purposes.

'Finally, we hope to establish regular exchange of information between our two countries on this important work.'

Work on underground gasification is known to be in progress at five places: Lisichansk; Angreskaya, near Tashkent; Yuzhno-Obinskaya in the Kuzbas; Chakhatinsk, in the North Caucasus; and Tula, South of Moscow. In Moscow there is a large Underground Gasification Research Institute, and at Stalino an Underground Gasification Design Institute.

Dr. Balfour added: 'Although work in Britain is concentrated on bituminous (black) coal, we shall be interested to see Soviet progress with brown coal because there are extensive deposits of brown coal in the British Commonwealth as well as in Europe.'

The other members of the party now in Russia, are: Mr. J. Norval, Chairman, Underground Gasification Executive, National Coal Board; Mr. W. M. Noble, Deputy Production Director, East Midlands Division, N.C.B.; Mr. J. H. Lander, partner of Sir Alexander Gibb and Partners, the N.C.B.'s consultants for the Newman Spinney contract; and Mr. F. E. Warner, of Cremer & Warner, consulting chemical engineers, also consultants on the Newman Spinney contract.

Scottish Daily Mail Exhibition

A view of the approach to the Scottish Gas Board's Pavilion at the Scottish Daily Mail Ideal Home Exhibition, Waverley Market, Edinburgh, October 24-November 9.

New Chimney Stacks—Not Coke—are What we Need, say Miners

ONE hundred all-steel houses on the Pinfold estate at Royston, near Barnsley, have grates designed for burning smokeless fuel with 'straight through' metal tubes serving as chimneys. But as most of the tenants are miners nothing is burnt in the grates but coal.

The result is that occasionally blazing soot deposits come crashing down damaging rugs and carpets.

Substitution of smokeless fuel for coal might be the simplest way out but it would only create a far greater problem, says Mrs. Hilda Hill of West Pinfold, who recently brought the matter to light by writing about it to Royston Urban Council, owners of the houses.

Miners, she points out, are jealous of their ton-a-month home coal concession and would not take kindly to having it 'meddled with.'

'Peace of Mind'

While most tenants would contest any move which entailed them making a contribution towards the difference in price between coke and coal, Mrs. Hill thinks, they would readily agree to a rent increase to meet the cost of having proper chimney stacks built. 'That is the only thing that would bring complete peace of mind,' she said.

DIAL BELL 4900 FOR *STREAMLINED* SERVICE

THE Scottish Gas Board has begun streamlining its consumer service arrangements in the Glasgow area. Under the new set-up consumers who dial Bell 4900 will be attended to by a specially-trained team of telephonists, who will be able to answer queries about all kinds of appliances without shuttling the caller through a range of departments.

The same team will handle emergency calls through a control room linked by radio telephone to a fleet of service vans strategically placed throughout the city.

MANX GAS

PERMISSION has been given to the Douglas Gas Light Co., by the House of Keys, the Manx Parliament, to increase its renewal fund from one-tenth to one-quarter of its capital.

It was explained that the necessity arose because of the inflationary spiral.

B.J.G.A. JOINT COUNCIL JUBILEE MEETING

Manchester District Visit Partington on Same Day

THE British Junior Gas Associations' Joint Council was formed on November 2, 1907, at Manchester. Exactly 50 years after that date its officers held the 1957 annual meeting within the North Western Gas Board's area to celebrate the jubilee anniversary as a gesture, much appreciated, to the Manchester District Association for the pioneer work of its turn-of-the-century predecessors.

It was a happy coincidence that the Manchester District held its November meeting on the same day, at the Partington works, which was inspected by its own members and visiting representatives of other districts, who were accompanied by their ladies.

An interesting programme of events which had been arranged for the Joint Council opened with a jubilee meeting at Buxton. A cordial welcome to the visitors was given by Mr. W. Hodkinson, Vice Chairman of the N.W.G.B. who also proposed a toast to the Joint Council, whose Chairman, Mr. A. Cole, replied. The President of the Council, Mr. J. Gray, submitted a toast to the Institution of Gas Engineers to which Dr. Burns, President, responded.

Coach Tour

On the following day, the ladies enjoyed a coach tour of the beauty spots of Buxton and district, calling at Haddon Hall for a conducted tour of the ancient home of the Duke of Rutland. Luncheon was provided by the N.W.G.B.

Later delegates and their wives travelled by coach to the Opera House, Manchester, for the première of the new American musical, 'Bells are Ringing,' followed by supper.

They toured Partington works on Saturday at the invitation of Mr. John Wilson, General Manager of the Manchester Group. Mr. Wilson welcomed them at luncheon and, on their behalf, Mr. J. A. Tomes, Chairman of the Council, returned thanks. The visitors were greatly impressed by the modernity of the works and saw the manufacture of the new smokeless fuel, 'Phimax,' and the 'Rochdale' process. Sales of the smokeless fuel were stated to have increased week by week.

Tea Party

Before the delegates dispersed to their homes they had tea at the works canteen. Here they were welcomed by Mr. J. K. Lord, President of the Manchester District, and short speeches were made by Mr. J. D. Grant, Secretary, London and Southern, and Mr. A. Cole, who is a former Chairman of the Executive Committee, in which they thanked the area Board for hospitality.

Mr. Lord commented upon the importance of the day in the history of the Council in which, he believed, all the Associations felt pride and for whose work they were grateful.

WILL METHANE PAY DUTY?

THE Board of Trade are considering an application for the exemption from import duty of methane.

Any representations which interested parties may wish to make in regard to this application should be addressed in writing to the Board of Trade, Tariff Division, Horse Guards Avenue, Whitehall, London, S.W.1, not later than November 26, 1957.

The B.o.T. explain that methane is natural gas which can be used for lighting and heating in the same way as manufactured (town) gas.

Mr. Grant said it was most fitting that the jubilee meeting should be held with the Manchester Juniors, whose welcome the visitors greatly appreciated. He expressed thanks for the hospitality the visitors had received and the excellent arrangements made for them.

Mr. Cole followed in similar vein. As they travelled home, he said, they would be able to reflect with great pleasure on a very happy occasion. They were greatly indebted to the management and staff at Partington for their efforts, jointly with Mr. John Wilson, Mr. Preston and others and especially Mr. Hodkinson, for everything done to make the visit memorable.

Visiting Presidents

Visiting Presidents included:—Yorkshire, Mr. E. S. Carter; Wales and Monmouthshire, Mr. R. H. Handford; Western, Mr. J. D. Taylor; Northern, Mr. C. W. Robson; Midlands, Mr. D. J. Hobarth; London and Southern, Mr. C. H. Purkis; Scottish Eastern, Mr. J. M. Brown; Scottish Western, Mr. G. B. Scott, with the Secretary of the Joint Council, Mr. H. J. Reynolds of Wolverhampton.

The Joint Council's meetings were held privately. Subsequently Mr. Reynolds announced that new officers had been elected as follows:—Chairman, Mr. Tomes, Stourbridge; Senior Vice Chairman, Mr. Grant, London; Secretary, Mr. Reynolds; Treasurer, Mr. E. T. Pickering, Birmingham; and Transactions Secretary, Mr. H. Cooke, London.

London Gas Bowling Association

DRAWN from bowls clubs in the three Boards serving the London area, the London Gas Bowling Association recently held the finals of this year's competitions at the Acton sports ground of the North Thames Gas Board, the Association President this year being Mr. W. Waters of the Board's Edgro Club.

Three competitions were decided, Mr. A. E. Bailey (South Suburban) beating J. Neal (North Thames) in the singles; Messrs. A. Horrocks and C. Froom (North Thames) beating Messrs. W. Squire and F. R. Smith (Tottenham) in the pairs, while the triples competition went to Messrs. Squire (A.), Squire (W.), and Smith (Tottenham), who beat the Croydon Gas trio (Messrs. C. Biggs, C. Valentine, and R. Gume).

Members of the London Gas Bowls Association pictured above are (back row, left to right) Mr. E. Smith; Mr. W. Waters, President; Mr. W. Squire; (front row) Mr. R. Gunner; Mr. C. Biggs; and Mr. C. Valentine.

Thank You, Says Alderman Hoy to the Managers

THE Mayor of Sunderland, Alderman Joseph Hoy, recently thanked Divisional General Managers of the Northern Gas Board for the help they had given him as Chairman of the Northern Gas Consultative Council.

Alderman Hoy gave a civic reception to the Managers, who held a meeting in Sunderland, and told them that he had the greatest admiration for the work they were doing. 'You are,' he said, 'the all-important link between the area Board right down to the workmen at the retorts and the consumer.'

Managers present were Messrs. W. O. Kirkwood (Sunderland Division); J. E. McManns (Blyth); A. R. Croft (Cumberland); F. Wilson (Darlington); J. W. Pallister (Tees-side); W. Sutcliffe (Tyneside); and A. S. Middleton (Commercial Officer, Northern Gas Board).

Sulphuric Acid from Coke Oven Gas in France

BY installing a sodium desulphurising plant the Houillières du Bassin du Lorraine are now able to supply the great majority of the sulphuric acid they need from their own coke oven gas, and are virtually independent of outside supplies.

Needs 10,000 Tons

The firm needs 10,000 tons of acid a year for the manufacture of ammonium sulphate and 4,000 tons a year for the recovery of tar acids and for other purposes, together with a further 4,000 tons a year consumed by Societé Ugilor (an H.B.L. subsidiary) and Societé d'Ugine at Carling (Lorraine).

The coke oven gas contains 5-6-grams per cu.m. of H_2S (218-262 g. per 100 cu.ft.) of the gas available, 1-5 mill. cu. m. (53 mill. cu.ft.) per day must be purified for transport to Paris, with the recovery of ten tons of sulphur.

Working Satisfactorily

The gas is washed under slight pressure with a solution of sodium carbonate, and this solution is later heated under a partial vacuum to liberate the H_2S. Researches into the manufacture of sulphuric acid from this gas began in 1953, and a plant for its manufacture with a capacity of 40 tons per day of 100% acid was ordered in March, 1954. It was commissioned in 1955 and is now working satisfactorily.

N.W.G.B. Women Placed High in First Aid Competition

THE TWO GAS INDUSTRY TEAMS TRY HARD FOR ST. JOHN ASSOCIATION RIBAND

THE first aid teams representing the gas industry in the Grand Prior's trophies contest, the blue riband of the competitions, acquitted themselves well. The women, from Liverpool, were second and were very nearly victors, and the men were sixth, the highest position so far attained.

The competition was held at the Porchester Halls, London, last week. Mrs. Bessie Braddock, M.P. for the Exchange Division of Liverpool, watched the North Western Gas Board team do their team test. The halls were packed, which confirmed the declaration made later by the Director-General of the St. John Ambulance Association, Mr. Horace Parshall, that interest in first aid was growing year by year. Their ambition was that there should be at least one first-aider in every family in the land.

The St. John Ambulance team from Whitwick colliery won the men's trophy with 329 marks out of a possible 400. They scored 168 in the team test and 161 in the individual test.

Equalled Top Score

The Eastern Gas Board, although sixth, were only 17 points behind the winners at 312 points. In their team test, in fact, they equalled the top score of 186, but they fell down badly in the individual tests, scoring only 126 points.

The women's event was won by a Post Office team, Headquarters No. 1 Branch, with a total of 342½ marks (163 for the team test and 179½ for the individual tests). The North Western Gas Board's team scored 336½, made up of 148½ for the team test and 188 for the individual tests, which was the highest score on the table. It was the general opinion that only a lapse in summoning an ambulance in the team test prevented the girls from an outright victory. For the first time the individual tests were open to public inspection.

The Teams

The teams were: Eastern Gas Board (St. Albans) (men): Derrick Williams (Captain), Reginald F. Carter, Donald J. Whitehead, Edwin C. Martin, James W. Nicholson (reserve).

Women—North Western Gas Board (Liverpool Group), Miss Vivienne Spackman (Captain); Miss Constance H. Price, Miss Maureen L. Anderson, Miss Zena Parry, Miss Patricia A. Leece (reserve).

Diary

November 21.—MIDLAND JUNIORS: Visit to the G.E.C. works, Witton, Birmingham.

November 23.—YORKSHIRE JUNIORS: Silver Street, Doncaster. 'Safety Governors and Low Pressure Alarms' by J. A. Whitworth. 2.30 p.m.

November 26.—INSTITUTION OF CHEMICAL ENGINEERS: Albemarle Street, W.1. Joint symposium on recent developments in industrial low temperature gas separation. 9.45 a.m.

November 26.—SOCIETY FOR ANALYTICAL CHEMISTRY: Burlington House, Piccadilly, London, W.1. 6.30 p.m. A.G.M. of the Physical Methods Group. An ordinary meeting will follow with a lecture by the retiring Chairman, Dr. J. E. Page.

November 27.—LONDON AND SOUTHERN JUNIORS: Visit to I.C.I. Technical Service and Development Laboratories at Welwyn Garden City. 2.15 p.m.

November 27.—I.G.E. LONDON AND SOUTHERN SECTION: Pepys House, 14, Rochester Row, Westminster, S.W.1. 'The Organisation of Maintenance in a Large Oil Refinery,' by R. D. Reed. 2.40 p.m.

November 27-28.—INSTITUTE OF FUEL: Institution of Civil Engineers, Great George Street, London, S.W.1. Second conference on pulverised fuel. 10 a.m.

November 28. — EASTERN JUNIORS: Peterborough. Short paper reading competition.

November 29.—JUNIOR INSTITUTION OF ENGINEERS: Pepys House, 14, Rochester Row, Westminster, S.W.1. A.G.M. and annual meeting of contributors to the benevolent fund. 7 p.m.

December 3.—MIDLAND JUNIORS: Council House, Birmingham. 'Industrial Space Heating' by C. A. Lewis, Radiant Heating, Ltd.

BLAST ROCKS N.T. COLLIER

AN explosion in the forward hold of the North Thames Gas Board's 2,700-ton motorship Thomas Livesey while she was at Sunderland damaged hatch covers and the bridge structure of the vessel.

Crew Unhurt

The crew escaped unhurt, but two ship repairers were treated for burns at Sunderland Royal Infirmary.

The accident took place at the Sunderland ship-repair yard of T. W. Greenwell & Co., Ltd., where the vessel was undergoing minor repairs after taking aboard a cargo of coal in the River Wear.

Blast from the explosion was felt over a mile radius of the ship.

Output Decline

Coleraine (Co. Londonderry) undertaking manufactured 11,830,900 cu.ft. of gas from September 27 to October 25, a decrease of 1,189,100 cu.ft. compared with the corresponding period last year. Total gas made from April 1 to October 25 was 88,372,000 cu.ft., compared with 97,996,000 cu.ft. for the same period the previous year.

THE BUILDING EXHIBITION

The Queen, who is Patron of the Building Exhibition, showed much interest in the Gas Council stand when she visited Olympia. Here she is seen discussing with Mr. R. J. Gregg, Gas Council Publicity Manager, the Halcyon selective air heater by William Sugg & Co., Ltd. Also pictured above are Mrs. M. A. Montgomery, Managing Director of the Exhibition; Mr. Charles Warrenne, Gas Council Exhibitions' Officer; and (extreme right) Mr. Charles Oxenham, Gas Council, stand Manager.

THE largest of its kind in the world, the 1957 Building Exhibition opened at London's Olympia a week ago today, and has now run half its course. This two-yearly event is of particular value to the gas industry in providing an opportunity of familiarising architects, builders, and housing authorities with the advantages of our twin fuels—a familiarity which must inevitably be reflected in increases in the domestic and commercial loads.

The Queen who is Patron of the Exhibition, which was opened by Mr. Henry Brooke, Minister of Housing and Local Government, visited Olympia on the following day, when she displayed much interest in the Gas Council stand.

In his speech at the opening ceremony, Mr. Brooke said the Exhibition was an impressive shop window to display what Britain could do in all the building trades and materials. He was proud of the plumbing unit for a frost-proof house—'and don't we all wish we had one?'—which his Ministry was exhibiting.

Since he had been Minister of Housing and Local Government he had become more conscious than ever of the tension, in all departments of life, between the forces of tradition and the forces of change.

'Perhaps no other industry has retained such a large traditional element as the building industry without suffering for it. But new methods are steadily coming in, and I believe it is the best and most efficient firms which have the most open minds about them. Certainly we have got to learn to build faster.

'I am watching keenly the experiments in close co-operation between architect and builder at the design stage—a co-operation at that stage which may not be so important in traditional work, but may have valuable results when breaking new ground.'

This theme was clearly kept in mind in the devising of the **Gas Council's** stand on which the planning and installation of efficient services in modern housing schemes are ably demonstrated, as well as cooking, water heating and space heating in community centres and schools, commercial premises, industrial canteens, and places of entertainment. Some of the latest gas and coke equipment available for purposes of this kind is on view.

Much of the emphasis is on flues, and on this impressive, double-deck stand are to be seen some of the results of the considerable research work carried out during the past few years by gas industry scientists and technicians to evolve simpler and more easily installed flues for gas and coke appliances.

Perhaps the main feature on the stand is the Halcyon selective air heating system (described fully in the October 23 issue of the 'GAS JOURNAL') which the Queen is seen inspecting in the picture.

A feature of the **Coal Utilisation Council** stand is a demonstration of the new small bore pipe central heating system developed by the **British Coal Utilisation Research Association.** There is a similar feature on the stand of the **Department of Scientific and Industrial Research.**

Cleverly demonstrated is the way in which the pipes of this system can be taken through holes of only ¾ in. diameter in the walls without cutting away brickwork and how, in existing houses, the pipes can be made very nearly invisible without structural alterations.

Also on show here are methods of insulation featuring the two booklets 'Make your House Cosier in Winter' and 'Building for Warmth,' reviewed during the year in these columns; and displays to aid in the choice of fuels and appliances and their fixing.

The **National Coal Board,** as one of the biggest manufacturers of bricks in the United Kingdom, are displaying some of the types produced by the various divisions, including a variety of facing, engineering, acid resisting, and common bricks.

Also to be seen are their fireclay goods, including salt glazed pipes and refractory bricks, as well as some of the proprietary by-products produced by the Board from their coke ovens, such as Synthaprufe, Presomet, and Presotim.

Among gas appliances manufacturers, **James Stott & Co. (Engineers), Ltd.,** of Oldham, use plans, perspective drawings, and photographs to demonstrate their catering planning service. This provides layout plans for modernisation of existing kitchens or fully equipping new ones for industrial canteens, hospitals, schools, hotels, restaurants, cafés, hostels, in fact, wherever people foregather for food.

The booklet 'Kitchens and their Planning,' already known to architects and students all over the world, has been reprinted and copies are available at the stand.

In the **Hurseal Group, Gulf Radiators Ltd.,** exhibited specimens of all types of their radiators together with colour transparencies and slides of attractive examples of the new trend towards heating in harmony. Particularly interesting is the new Hurseal-Gulf 'packaged' off-the-shelf stoved enamel hot water radiators scheme.

Hurseal, Ltd., themselves the originators and largest manufacturers of permanently oil-filled column and panel radiators, show a comprehensive range of gas-operated radiators, including several 'portable' types which can be moved from room to room as desired. Colours are a feature of Hurseal radiators, which are available in cream, white, bronze, eau-de-nil, sky blue and gold.

The Hurseal 'Hurdapta' was the first restricted throat convector open fire to be marketed and is still claimed to be the most efficient of any convector fire. Two models, the standard 'Hurdapta' and the 'Hurdapta' III with complete range of accessories, are to be seen.

F. A. Borchardt, Ltd., show the full range of DRUgasar balanced flue gas space heaters and the application of thermostatic control.

Familiar throughout the industry, the DRUgasar is the result of experience gained over many years. It is robustly constructed and designed to give convected as well as radiated heat. It is fitted to a specially constructed flue equipment so that the heating unit is completely sealed from the room which is being heated and ventilation problems are obviated.

The DRUgasar is characterised by safety, ingenious lighting and heat control, efficiency and long life; it requires no chimney flue and there is no projection on the outside wall. It is therefore ideal for warming premises where the heating is intermittent in character, such as offices, churches, church halls, clubs, schools, clinics, waiting rooms, etc.

Electrolux, Ltd., are exhibiting their 'built-in' model M.170 and the free-standing L.24 refrigerators.

The model M.170 is already well known to builders throughout the country. It can be built into the sink unit or placed in a cupboard at chest height, and can be supplied with left hand or right hand door. It has an external finish of white or cream.

The model L.24, described in the October issue of the 'GAS JOURNAL,' is one of the Electrolux 1958 range of new refrigerators.

This new family model has a shelf area of 5 sq. ft. and incorporates a newly designed silent absorption unit of even greater efficiency, an ice compartment which will hold normal size frozen food packets, a new door shelf arrangement for lager, lemonade, and fruit juice bottles, and a rack for eggs.

It has a sturdy and resilient door handle in a new type nylon, and the colour scheme is either white or cream with ice-blue door handle, gasket and inner door facings.

Pride of place on **Ascot Gas Water Heaters, Ltd.,** stand is given to an actual installation of modern room sealed gas appliances in the revolutionary new Se-Duct. Sponsored by the Gas Council, the Se-Duct is a single centrally situated vertical duct representing an important step forward in modern installation techniques and offering outstanding advantages to all architects and builders of new maisonettes and flats.

Built of low-priced durable units of refractory concrete the Se-Duct enables room sealed appliances such as the Ascot 727 multipoint gas water heater, space heaters and drying cabinets to be fitted easily and economically in all rooms and not, as formerly, in outside walls alone.

The Se-Duct system, which has been fully described in the 'GAS JOURNAL,' replaces traditional flues and achieves improved layout of dwellings plus large savings in capital installation costs. The Se-Duct adds considerably to the efficiency of the gas appliances connected to it and enables them to be completely sealed off from rooms. The duct, open

The emphasis on the Gas Council stand is on flues. Pictured above is an example by True Flue Ltd.

A general view of the excellent 'double - deck' Gas Council stand showing the point where the Queen stopped to view the Halcyon heater when she visited the Building Exhibition.

to the atmosphere at top and bottom, supplies air for combustion and carries away the products of combustion.

The Se-Duct installations on the Ascot stand includes room sealed appliances of all types comprising a full heat service controllable by the turn of a tap. Elsewhere on the stand the wide range of Ascot instantaneous gas water heaters is on show demonstrating how the Ascot system provides an efficient, versatile and economic answer to any hot water problem, whether in new housing or in the conversion or improvement of older properties.

Hot water produced by gas is also to the fore on the **Radiation Group Sales, Ltd.,** stand in the Grand Hall.

Here, the New World Stratalyn Regulo controlled gas water heater for attachment to a hot water storage cylinder or tank, under the draining board in the kitchen, or in an airing cupboard, by means of a simple connection in much the same manner as an immersion heater; and New World circulators fitted to lagged cylinders, which can be accommodated under the draining board in the kitchen, are also shown.

Ductair

On the Radiation Solid Fuel Division stand in the materials section, an important development in the form of a new Radiation Ductair Heating system is publicly demonstrated for the first time. The Ductair 20 is designed to provide thermostatically-controlled warm air heating to full comfort standard for the smaller house or average flat, or background heating for the larger house, from a solid fuel or gas heater. In either case, the unit also provides domestic hot water.

Also seen is the Heatmaster, the first appliance to provide from one unit the three essential services, cooking, hot water and home heating by warm air, all under automatic control. It is also the first cooking appliance burning coke or coal (virtually smokelessly) to provide thermostatic control over a full range of oven temperatures.

The Yorkmaster, a thermostatically-controlled cooker and water heater, developed from the Heatmaster, is also demonstrated for the first time.

Other exhibits include Parkray smoke-consuming fires, and the new Eagle No. 3A boiler flue set and inset fires.

Among other solid fuel appliances manufactured, **Newton Chambers & Co., Ltd.,** show the Redfyre No. 4A Bacboiler, a slightly modified version of the Redfyre No. 4 Bacboiler, together with a range of the Redfyre continuous burning fires which can be installed either with or without the back boiler unit.

The Redfyre open convector fire is displayed with a choice of attractive screens to match any type of fireplace surround. This appliance has been designed for easy fixing to existing fireplaces and gives old fireplaces a new look and a high efficiency.

The Redfyre domestic boiler is the newest addition to the range of solid fuel burning appliances and has many features which will appeal to those who need a modern solid fuel water heater of attractive appearance, efficient performance and ease of operation.

Ideal Boilers & Radiators, Ltd., show a representative selection of Ideal boilers for domestic hot water supply, designed to burn smokeless solid fuels, as well as boilers specially designed to burn gas for either heating and 'Indirect' hot water supply or for domestic hot water supply only.

The Ideal Neofire, an open fire which provides background heating and domestic hot water, is also shown, and there is a display from the many different types of Ideal cast-iron radiators and Ideal hot water circulating towel rails.

Allied Ironfounders, Ltd., have an interesting selection of fires and boilers, including the Marvec with the 205 convector surround; the Lexham suite; the Lowburn fire with boiler flue set; and three Rayburn fires.

The certificate-winning Rayburn convector fire was chosen for outstanding design earlier this year at the Design Centre. The Rayburn Open fire, which has all the advantages of an efficient continuous-burning fire, and the Rayburn Sunk fire are also on display.

On the **Thomas De La Rue & Co., Ltd.,** stand are displayed a representative selection of 'Potterton' gas-fired boilers, including the recently introduced 'Diplomat' range of gas-fired boilers.

The main theme of the stand is, however, on the Company's new training school which has recently been opened at Balham, as reported in the October 23 issue of the 'GAS JOURNAL.'

The purpose of this school is to provide comprehensive courses of instruction on the installation and maintenance of 'Potterton' oil- and gas-fired boilers and the service is provided free to the staff of heating engineers who wish to qualify as 'Potterton-Approved Installers.'

The training programme will include the use of modern visual aids, and the latest teaching techniques will be employed. As an example of this a training film, in colour, is being projected on the stand.

A comprehensive display of central heating equipment is to be seen on the stand of **Crane, Ltd.,** including domestic solid fuel boilers, for storage tanks up to 60 gal. The 'Carlton' and 'Whitehall' models are represented, also 'Pall Mall,' 'Hospital' 'Wall' and 'Concealed' radiators, and their latest development of the 'Skirting Heating System.'

Of special interest is the Crane skirting heating system installed under working conditions in an attractive setting. There are two types of heating skirting panels: type R, which is purely radiant, and type RC, which combines radiation and convection, and the well-arranged display demonstrates how conspicuously this new heating medium blends in perfectly with its surroundings.

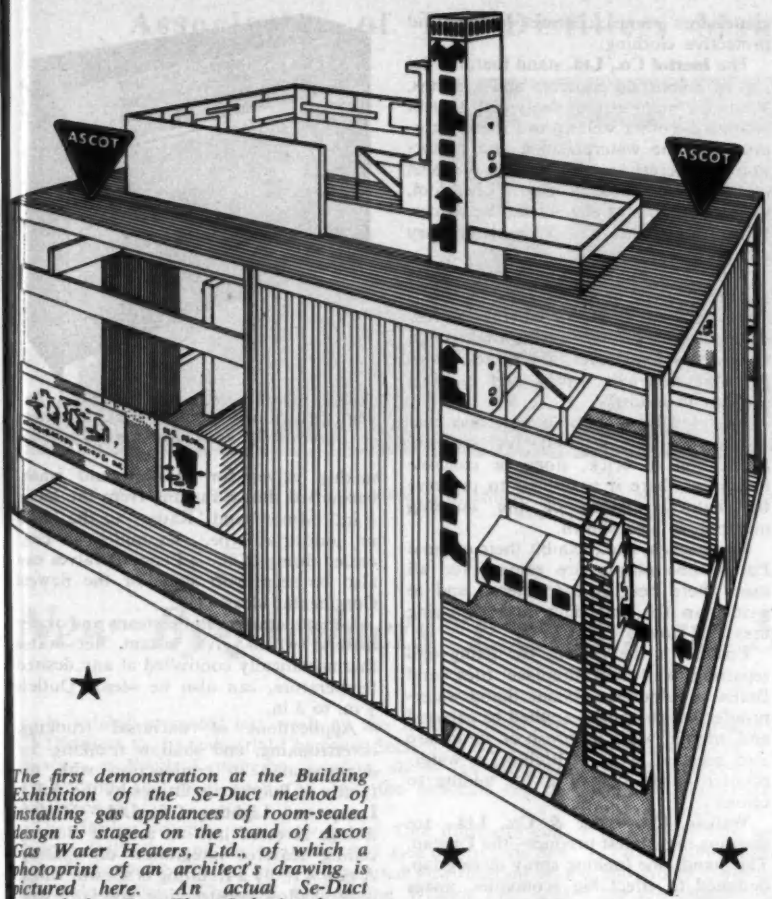
Another prominent appliance is the Crane 20 Domestic Boiler. It is totally enclosed, cream or white finish, thermostatically controlled, and suitable for most present-day houses of three or four bedrooms.

Federated Foundries, Ltd., are showing a representative selection of the products made by the 15 companies of the Group, including the range of Sofono solid fuel appliances. Grange-Camelon Iron Co., Ltd., is one of the companies in this group.

Among firms other than appliance manufacturers who are well known to the gas industry is **Hilmor, Ltd.,** who are exhibiting and demonstrating a large and comprehensive range of hand-operated, hydraulic and motorised tube bending machinery widely used by the gas fitter.

All of the long established 'GL' and 'EL' lightweight portable bending machines have been redesigned to incorporate new and exclusive improvements and several entirely new models are shown for the first time. Experienced operators demonstrate machines and give advice and information on all aspects of tube manipulation.

Looking down on the Gas Council stand. Note the use of plain brick walls as a background for demonstrating flues.



The first demonstration at the Building Exhibition of the Se-Duct method of installing gas appliances of room-sealed design is staged on the stand of Ascot Gas Water Heaters, Ltd., of which a photoprint of an architect's drawing is pictured here. An actual Se-Duct erected by True-Flue, Ltd., is shown, together with photographs of work in progress on the first Se-Duct installation in this country in a block of flats now being built at Gateshead. Ascot water heaters and Sugg space heaters are installed on the stand and technical representatives from all three companies are in attendance.

The theme of this year's **Zinc Development Association** display is the versatility of zinc in building and its increasing use in well-designed buildings today; while **Turners Asbestos Cement Co., Ltd.,** show a wide range of products including two types of insulating roofing, making use of a glass fibre infill. These are combined sheet and largespan combined sheet, a double skin roofing, the insulation value of which has been further increased by the cavity being packed with glass fibre. The second type is formed by using an 'Everite' asbestos-cement inner-skin panel with 'Bigsix' or Trafford Tile, being suitable for 4 ft. and 4 ft. 6 in. purlin spacings.

The **Dunlop Rubber Co., Ltd.,** whose products are widely used in the gas industry, exhibit adhesives for use in the building industry including the fixing of ceramic, acoustic and other tilings; floor laying and the adhesion of synthetic laminated plastic sheeting. P.V.A. emulsions as a basis for emulsion paints and in cement are also shown.

G. A. Harvey & Co. (London), Ltd., show a comprehensive range of their metal products including woven wire gauze in all meshes and gauges for screening, grading, and sifting requirements; steel furniture for office and works, steel storage racks and bins, sheet metal and steel platework for industrial plant of every description in steel, stainless steel, monel metal and nickel.

Saml. Denison & Son, Ltd., demonstrate a 200-ton TIB/MC electrically operated hydraulic compression and transverse testing machine with console. Seen here for the first time is an entirely new and outstanding portable compression machine of 150 tons capacity.

Rawlplug Co., Ltd., show their well known range of Rawlplugs, Rawlbolts, and Rawltools. The range of Rawlplug tools for hole boring in masonry now covers every need from small hand tools to mechanical electric and pneumatic tools, while Durium masonry drills from No. 6 to No. 30 for hand or suitable electric drill have revolutionised hole boring.

A long series is made to take interchangeable extension rods which give 12 in. and 16 in. drilling lengths. The Rawlplug R.P.I. slow speed, high torque drill is the recommended power.

The range of 'Yorkshire' products exhibited by **The Yorkshire Copper Works Ltd.,** includes 'Yorkshire' light gauge, copper housing tubes for domestic hot and cold water, gas, waste, heating and sanitation services; 'Yorcalon' (long length) copper tubes in 30 ft., 45 ft. and 60 ft. coils for underground water supply pipelines and panel heating installations; 'Yorkshire' chromium plated tubes and fittings; and various 'Yorkshire' fittings.

'Polyorc A' and 'Plastronga' (high strength) Polythene tubes and 'Plastronga' polythene fittings are also seen and foreshadow the day when winter's crop of burst pipes will be nothing but a memory.

Stewarts and Lloyds, Ltd., are exhibiting a wide range of their products, including black and galvanised screwed and socketed steel tubes to B.S.1387; steel tubes to B.S.1387 with 'Security' coating, glass tissue wrapping and bitumen lining, together with a demonstration of the method of continuing the protection internally and externally at the joints.

A collection of screwed and socketed steel tubular fittings is also seen as well as a wide selection of joints used for gas, water and steam including loose flange joints, welded and inserted joints, Viking Johnson couplings and Victaulic joints; seamless steel butt-welded pipe fittings.

Examples of plumbers' foundry products manufactured by S. & L.'s subsidiary, John Russell & Co., Ltd., are also displayed.

Compressors

Broom & Wade, Ltd., show portable, single and two-stage rotary air compressor plant and pneumatic tools. The portable range includes a new, single-stage, rotary air compressor. Pneumatic tools feature the new 'Aro-Broomwade' lightweight pneumatic hoist in operation. **Stothert & Pitt, Ltd.,** exhibit concrete mixers, tilting drum machines, non tilting drum mixers, and a range of patent vibrating rollers of the hand propelled, power propelled and trailer type.

The Ford Motor Co., Ltd., is displaying the diesel version of the Fordson tractor which is also available with petrol engine. Mounted on the tractor is shown the Leeford twin-jack muledozer, while at the rear is the Witlor hydraulically operated skip.

The new Ford six-cylinder industrial diesel engine is also exhibited. This new addition to the range of Ford industrial engines, which is being shown for the first time, gives a maximum b.h.p. of 96 at 2,250 r.p.m.—B.S. one hour rating. This is an excellent power unit for a wide range of uses such as road rollers, generating and arc welding sets, compressors, lighting sets, cranes, marine conversions and municipal and contractors' equipment.

W. E. Bray & Co., Ltd., show three of the Bray range of loading shovels. These are the Brayloader 430 four-wheel drive shovel, 1 cu. yd. standard bucket, lifting capacity 25 cwt., maximum discharge height 9 ft., reach at 7 ft. discharge height 3 ft. 6 in.; the Brayloader 32 rear-wheel drive shovel, 1 cu. yd. standard bucket, lifting capacity 25 cwt., maximum discharge height 11 ft. 3 in., reach at 7 ft. discharge height 5 ft. 10 in.; and the Brayloader 25 fully-tracked shovel, 1 cu. yd. standard bucket, lifting capacity 3,000 lb., maximum discharge height 9 ft., reach at 7 ft. discharge height 3 ft.

For clean air and conversions—the new Rayburn No. 2 convector fire will fit into almost any fireplace thanks to its adjustable head.

On the **Whitlock Bros., Ltd.,** stand the Dozaloda heavy-duty tractor shovel and bulldozer is shown in its latest reinforced form together with some new extension arms designed for loading into hoppers and on to high scaffolding. The Whitlock Dinkum Digger trench excavator built on the rear of the same power unit enables every earth-moving job on the site to be carried out with the one unit.

The Company has a 2 cu. yd. scraper suitable for operation behind wheeled or tracklaying tractors now in production. This scraper is operated for depth of cut by the tractor hydraulics and a hydraulic ram employed to operate the tail gate and ejector enables accurate discharge of the load so necessary for levelling purposes.

Two other items of interest on the stand are the heavy duty dumper trailers and a passenger conversion unit for lorries and trailers which also forms a light and portable store or workmen's hut.

The latest all-hydraulic Loadmaster '700' is being exhibited by **Chaseside Engineering Co., Ltd.** Also on the stand are two other units from the wide range of equipment now manufactured by the Company—the Chaseside Hopto backhoe and swing shovel which first appeared last year, and which can dig a trench 11 ft. 6 in. deep and up to 3 ft. in width, and can also be used as a faceshovel; and, on show for the first time, the Chaseside 'Ant' a 1½ ton dumper which in strength, performance and appearance is an outstanding machine and one of the most economic aids to present-day site work, factory and yard application.

Thos. W. Ward, Ltd., show a Challenger 2 diesel loading shovel, a 'Forward' twin-bucket weigh-batcher, and a 'Smith' 8 excavator made by Thomas Smith & Sons (Rodley), Ltd., fitted with a back acting trencher.

The new T.W.W. portable bulk piler is also seen, as well as mixers, builders' and contractors' pumps, contractors' tools and protective clothing.

The **Inertol Co., Ltd.** stand features the use of colour on concrete and asbestos. While the main exhibit deals with Inertol enamel the other well-known Inertol products for the waterproofing and protection of concrete are also shown. A model of Cresswell Mount flats, Liverpool, shows how Inertol enamel can be successfully employed in contemporary architecture.

A range of Inertol bituminous products for the external protection of concrete is also exhibited; this group being entirely devoted to uses in sewage disposal works, waterworks, hydro-electric schemes, dams, gas and electricity works and building projects in industry.

Inertol silicone plus, a new one coat water repellent solution for external application to brick, stone or concrete buildings where it is desired to preserve the natural texture of the building material, is also shown.

Purimachos, Ltd., exhibit their original Purimachos plastic fire cement for all uses where heat is encountered and in particular for installing and repairing fires and stoves.

Fixatile, a tile cement for fixing and repairing wall and fireplace tiles, and Brella, a colourless silicone liquid waterproofer which can be applied to external and internal walls by brush or spray, are also seen, as well as Brelkos, a waterproofer in powder form for adding to cement.

Walker, Crosweller & Co., Ltd., are showing their latest product—the Unatap. This handsome looking spray mixing tap, designed to effect big economies, mixes hot and cold water, delivering at any temperature the user desires.

The well-known Leonard thermostatic mixing valves for showers and wash-basins are shown ranging from the latest ½ in. 'Minor' and 'Radar' to the big 3 in. industrial type. Examples of concealed fitting of these Leonard valves can also be seen with some of the newest Continental ideas.

Leonard thermostatic steam and water mixers, which give instant hot water thermostatically controlled at any desired temperature, can also be seen. Outlets ½ in. to 3 in.

Applications of universal trunking, invertrunking, and shallow trunking are demonstrated in conjunction with the family of fluorescent fittings by the **A.E.I. Lamp and Lighting Co., Ltd.** Module fittings recessed into an area of Burgess ceiling features integration of lighting. A new 4 ft. by 2 ft. fitting is shown, which is of shallow construction, specially suitable for low ceilings.

A model of a shell concrete roof lighting installation is also shown, while of special interest is the new range of commercial fittings—'Satina'—British design, British made Satin etched glass. A.E.I. Lamp and Lighting Co., Ltd., Mazda shop and display fittings are used for feature lighting on the stand.

British Paints, Ltd., have a wide range of exhibits, including B.P.L. primers, for wood, metals, cement, etc.; 'Epilux' coatings, providing a hard protective surfacing for woods and metals, B.P.L. masonry paint, fungicidal paints, 'Lignolac' cold setting lacquer, a fire-retarding glass-hard finish, eminently suitable for wooden floors subjected to extra hard wear, and P.R.C. sealing and coating compounds, which have unique properties of adhesion, flexibility and durability where positive sealing and long life are essential.

Two particularly interesting features of this stand are demonstrations of the application of Luxol 'one coat' paints—both high opacity enamel and fine quality flat wall paint—and the 'B.P.L. architects' service' dealing with colour and specifications.

Royal interest in the latest cooker development is captured, as Mr. P. C. Buckle, with characteristic skill and enthusiasm points out special features of the new Auto Range cooker to the Duke of Edinburgh during his tour of the Gas Section at the Building Centre on November 7.

Latest model DRUgasar balanced flue gas space heater fitted with magneto ignition by F. A. Borchardt Ltd.

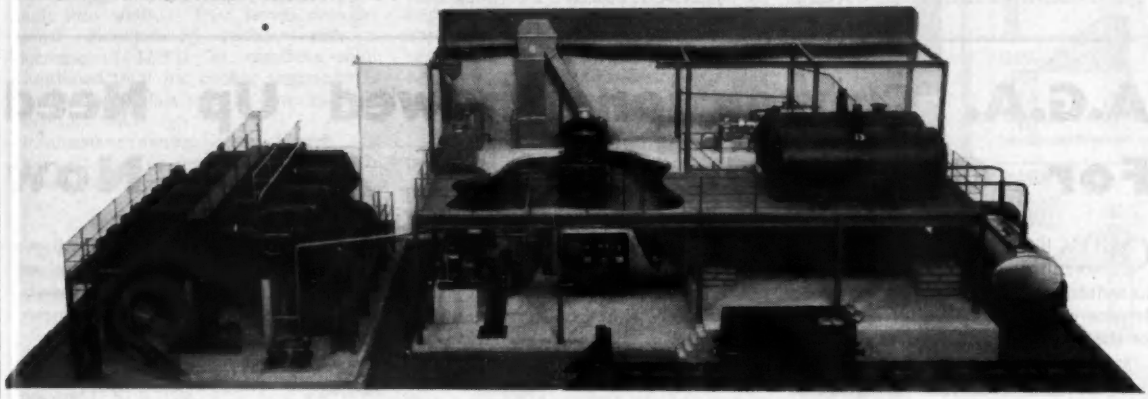
New Plant at Que Que

A large new gas cleaning plant is to be built by Head, Wrightson & Co., S.A. (Pty.), Ltd., of Johannesburg, for the expanding Que Que works, Southern Rhodesia. The plant will be to the design of the Head, Wrightson parent firm, of Thornaby-on-Tees, but most of it will be manufactured in the Union and Southern Rhodesia.

DE LA RUE PAY 10%

Thomas de la Rue & Co., Ltd., will pay an interim dividend of 10%, less tax, on ordinary stock for the year ending March 29, 1958.

Association of Tar Distillers Make Presentation



Model of the latest type of plant by Proabd (England), Ltd., to produce high-grade naphthalene either as liquid or as a crystallised product.

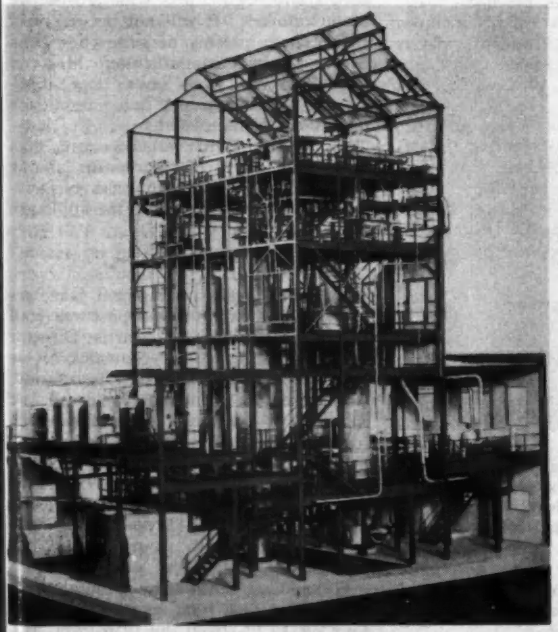
New By-products Exhibit in Science Museum

AN exhibit presented last week by the Association of Tar Distillers to the Industrial Chemistry Section of the Science Museum at South Kensington, London, shows the processes involved in, the plant used for, and the products of, the distillation of tar.

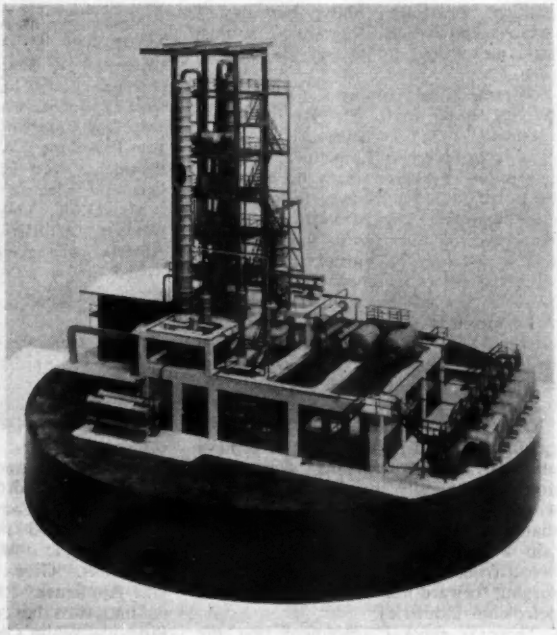
The display occupies two show cases. One illustrates continuous distillation and the treatment and uses of products and their derivatives by means of an illuminated flow diagram and two scale models. Chemical Engineering Wiltons Ltd., and the Woodall-Duckham Construction Co., Ltd., provided these models, of continuous tar distillation plants, which are on revolving switch-control bases.

In a smaller case is a sectioned model, donated by A.P.V. Co., Ltd., of a tar acid distillation plant, the original of which has produced 4,450 tons of refined phenols in the past year. Another model in this case is of the latest type of plant by Proabd (England) Ltd. to produce high-grade naphthalene either as liquid for transport in heat-insulated tank vehicles, or as a crystallised product.

An exhibit nearby was presented by the National Benzole and Allied Products Association earlier this year to tie up with the new displays, thus giving a broad picture of the by-products coal tar industry. Both are near the petroleum industry's exhibits, the whole indicating production of basic raw materials for the organic chemical industry, whose operations are displayed in the remainder of the gallery.



Model of the tar acid plant at Beckton gasworks.



Model of a continuous tar distillation plant.

: TRANSATLANTIC CABLE :: TRANSATLANTIC CABLE :: TRANSATLANTIC CABLE :

A.G.A. Convention Showed Up Need For Gas Industry to Unite Now

QUITE like having Sunday-after-Sunday devoted exclusively to sermons on 'sin,' American Gas Association's convention last month, in St. Louis, featured the well-worn topic of 'gas industry unity.' We're hardly opposed to industry unity, more than we favour rampant sin. But mouthings of industry segments most usually have monotonous and crafty pleas of special interest. Each wants unity on its own terms. Notable exceptions come in views of the very few industry statesmen.

Natural gas producers want to regain their freedom from federal regulation. They lost that in U.S. Supreme Court decision, which became law that is virtually impossible to administer equitably.

Long distance pipeline companies say very little. They just pass producers' price increases to undertakings, with Federal Power Commission helpless to do other than generally approve increases. So, pipeliners really don't need to enter this regulatory fray.

Undertakings, last on industry line, must decide to absorb tariff increases or pass a portion to consumers. In the latter case, they must get their own approvals from state commissions. As ultimate sellers of gas, they are the only ones with competitive problems; oil and electricity, principally, with only little coal consideration. Most undertakings favour federal regulation of producers; they are regulated and so are pipeliners.

So soon after unrestrained charges by producers and undertakings, each to the other, with 'page one' publicity for the nation to read, and revelations of corrupt political practices, unity portion of A.G.A. convention programme seemed little more than filling out the allotted time.

Statesmanlike comment on industry dispute came from Mr. Paul Kayser, President, El Paso Natural Gas Company, a producer and pipeliner. 'If any system of regulation is to be effective,' he noted, 'the authorities must have a clear understanding of both problems: An adequate incentive to the producers and a price at the burner tip that can meet the price of other fuels and thus preserve the efficiency of the service.' Also, Mr. Kayser emphasised, 'the pipeliners and the producers must understand that the distributor (the undertaking) can be priced out of the market.'

Of course, through all this, American gas industry had jolly well better achieve unity, by industry-balanced action and not by generally unconvincing selfish words. That had better be sooner rather than later, if gas is to build and maintain a successful offensive against the broad front of technological competition surging forward now in the electrical and petroleum industries.

There is general agreement that the best contribution to industry thinking on

: FROM HILDING CARLSON :

Robert W. Otto, *right, new President of A.G.A., seen with* **J. Theodore Wolfe,** *second Vice-President.*

the A.G.A. programme was a presentation of another approach to building summer gas loads with an air conditioner designed for all-year operation, cooling and heating.

Attendance at the convention was well down from counts of other years.

New roster of A.G.A. officers includes Mr. Robert W. Otto, President, who is Chairman of Board, Laclede Gas Company, St. Louis; Mr. A. W. Conover, first Vice-President, who is President, Equitable Gas Company, Pittsburgh; and Mr. J. Theodore Wolfe, second Vice-President, who is President, Baltimore Gas and Electric Company.

Mr. D. K. Yorath, President, Northwestern Utilities, Ltd., Edmonton, Alberta, was re-elected to the A.G.A. Board.

Bing Crosby will help the gas industry sell appliances during Christmas season. American Gas Association has assembled a formidable array of promotional material for a two-months campaign.

The Old Groaner will be featured in newspaper ads, displays, gift certificates, transportation advertising cards, 24-sheet billboard posters, all headlined, 'Bing Says: Make this a White Christmas. Give her an Automatic Gas Appliance.' A unique promotional mailing card has playable recording of Bing in 'White Christmas.'

During the campaign, Bing will join Mrs. America and Miss Julia Mead, gas industry hostess on TV programme, 'Playhouse 90,' to form personality-trio with wide acceptance and working in the interest of more gas appliance sales.

A happy and significant move in the right direction: A.G.A. has included National LP (liquefied petroleum)-Gas Council in Crosby promotion. That brings additional millions of gas customers, who are outside service areas of undertakings, within the area of effectiveness of the promotion.

American gas refrigerators went out of production early last month. Manufacturer, Servel, Inc., will not resume production while its management tries to dispose of refrigerator property. Meanwhile, presidents of four prominent undertakings represent industry in their own active negotiations with prospective manufacturers. It will not be necessary to purchase patents of properties from Servel to start manufacture. Meetings have been held with seven large appliance manufacturers, but discussion details are well-guarded.

Hopefully, there will be more than brave talk to fortify consensus among industry's management that gas refrigerators will not be crossed off the appliance list.

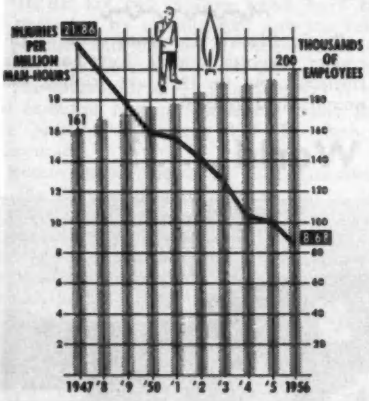
In central heating equipment sales, gas units have a comfortable post-war lead over oil, Mr. Edward R. Martin, Director of Marketing and Statistics, Gas Appliance Manufacturers' Association, emphasised in a summary released last month. In combined consideration of furnaces, conversion burners and boilers, he shows more gas units sold in seven of the years, 1946-through-1956, with more oil units in remaining four years. Total unit sales for 11 years were: gas, 8,386,600; ½ mill. more than oil, 7,829,300.

Gas cookers sent out by manufacturers during the first nine months of 1957 were off 10.2% from the 1956 level, Mr. Martin said. Under closer inspection

an increase of 19.7% appears for 'built-in' units, with top burners built into kitchen counter-tops and oven-broilers built into walls. That leaves conventional free-standing cookers with a decrease of 12.5% in numbers sold. Combined total for cooker shipments is now 1.5 mill.; last year at same point it was 1.65 mill.

Automatic storage water heaters are down 11.1% for the nine months, with a total of 1.9 mill. units sold.

Safety programmes throughout the American gas industry continue to show results. During the past ten years, while



employment increased by more than 24%, the industry's safety record improved 60%. With successive years of reduction in the accident frequency rate, American Gas Association reports that in 1956 it was 8.68 disabling injuries per million man-hours worked.

Electricity undertakings here have a way of being a top customer of the gas industry, volumetrically but not as to class of revenue. Federal Power Commission made that sore point worse by revealing August as a new high peak. Gas consumed for generating purposes then aggregated 160,964.25 mill. cu.ft.; 1.3% more than previous high, July; 13.3% above August, 1956.

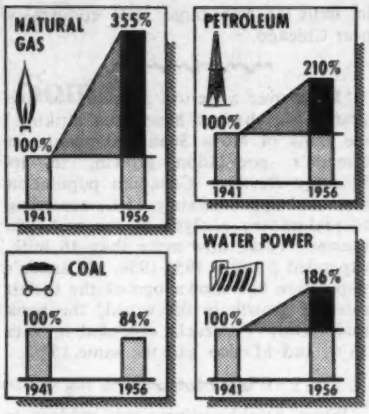
Coal consumption by electricity went to 13.3 mill. tons in August; 1.1% above the 1956 month, 4.8% above July. Coal stocks on hand at power plants, F.P.C. says, totalled 51.8 mill. tons on September 1. Based on August consumption, stocks are sufficient for 121 days of operation.

Fuel oil consumption in generating plants went up 5.1% from July to August total of 5.79 mill. barrels, 11.8% more than in the 1956 month. Stocks on hand at plants, September 1, amounted to 20.27 mill. barrels.

Southern California Gas Company welcomed Mr. Harry Chester, Chairman of the South Western Gas Board, to Los Angeles, on the first of a number of visits he will make during his tour of the American gas industry. Mr. Chester explained to a group of the undertaking's executives, headed by Mr. F. Marion Banks, President and General Manager, that he is on a study tour in which he hopes to get suggestions for possible application in his area. He outlined the supply problem in Great Britain and the continuing need for considering improved processes.

This is what recent purchasers of automatic gas water heaters replied when surveyed on why they did *not* buy electric heaters: They do not supply enough hot water . . . purchase price too high . . . operating cost too high . . . installation cost too high . . . didn't know there are electric water heaters. Survey by water heater manufacturers was discussed in electric utilisation conference. One electric executive stated that a 40-gal. automatic gas heater with an input of 35,000 B.Th.U. provides same hot water service as an 80 gal. electric heater. All that is almost certain to bring forth powerful electric water heater advertising and promotion.

Gas now accounts for 24% of energy consumed in America and has outrun all other sources in rate of increase since 1941, an October analysis by American Gas Association indicates. Gas consumption in 1956 was 355% of 1941 and the current reserves available for future production are at an all-time high. Petroleum comes closest to 355% for gas,



with 210% greater consumption last year than in 1941.

Current 24% of total energy credited to gas in America matches forecast within 20 years in Canada, reported in last month's dispatch. However, time probably will prove Alberta's Deputy Minister of Mines was rather conservative in allowing 20 years.

Five pipeline companies were authorised by Federal Power Commission to construct interdependent projects to deliver 485 mill. cu.ft. per day to, principally Chicago metropolitan area. Estimated combined cost of projects is £39.3 mill. One company proposes to deliver 115 mill. cu.ft. per day for utilisation

'Leader in New Policies'

American Gas Association's highest individual recognition, Distinguished Service Award, was presented this year to Mr. Leon Ourusoff, Assistant to senior Vice-President, Washington (D.C.) Gas Light Company. Retiring A.G.A. President, Mr. Clare H. Zachry (right), said Mr. Ourusoff was the leader 'in fostering new and practical policies for encouraging air conditioning research and developmental work by manufacturer . . . This has brought about two-fold or more increase in total industry . . . effort in vital field of gas air conditioning.

in mills of two large steel companies near Chicago.

'Even over a period as short as five years . . . changes have been striking,' the Bank of Nova Scotia comments on Canada's population growth, in its *Monthly Review*. Canadian population increased approximately 15%, according to preliminary analysis of the mid-1956 census. Total, now more than 16 mill., expanded 2 mill., 1951-1956. 'Canada's population has shown one of the fastest rates of growth in the world,' the bank said. Only Venezuela exceeded it, with 16%, and Mexico had the same 15%.

Warm neighbourliness was evident in quarterly report to shareholders by Mr. Charles H. Gueffroy, President, Portland (Ore.) Gas and Coke Company. Noting completion of construction and beginning of operation for Westcoast Transmission Co., Ltd., he wrote that 'appropriate ceremonies were held in British Columbia to celebrate. . . .' With obvious personal satisfaction, he closed the report by emphasising 'the states of Oregon and Washington will . . . be supplied with natural gas from the Canadian source and the San Juan Basin source will become a standby in the event of emergencies.' Mr. Gueffroy was foremost in advocating Canadian gas, but lost out when an American project was authorised to transport gas to the Pacific North-west of the U.S. from San Juan Basin. Now, through essential and basic changes in American project, Mr. Gueffroy will have Canadian gas for the Portland undertaking's distribution system.

Here we go again! Gas industry's perennial adversary, coal with its faded markets, opposes importation of Canadian gas from Trans-Canada pipe line into mid-western U.S. Mouthpiece, this time, is congressman from Pennsylvania who objects to 'foreign' (improper word for Canadian-American relations) fuel that would displace coal and employment in mines, railways and on truck routes. Prediction: If and when gas moves in Trans-Canada line, portion of it will be sold to strategic U.S. markets. In the meanwhile, there always will be a politician, especially with elections so close.

Indications now, despite earlier assurances, point to a reopening of the Trans-Canada project as a controversial issue before Parliament.

Gas industry expansion in the Province of Alberta will require investments totalling nearly £143 mill. during the next five years, said Mr. A. C. Bailey, Vice-President and General Manager, Bailey Selburn Oil and Gas Co., Ltd., and former chairman of provincial conservation board. He allocated total to drilling and new plants, 25% each; gathering and transmission lines, 50%.

Westcoast Transmission Company Ltd., Vancouver, applied to Alberta Oil and Gas Conservation Board for approval to export 155 mill. cu.ft. per day, south-eastward to Idaho. A new 175-mile pipe line, 20- and 30-in., would be built.

Westcoast, in a share deal involving more than £16 mill., has taken over Peace River Natural Gas Company.

Success of the first Natural Gas Centre at the Canadian National Exhibition, Toronto, excited discussion about a permanent building on Exhibition grounds. While subject was brought before directors of the Canadian Gas Association, there was no decision on how the Centre will be continued.

In New Brunswick, the Utilities Board permitted New Brunswick Oilfields, Ltd., producer in easternmost oil and gas field on this continent, to put up its price 100% to Moncton Electricity & Gas Company, local undertaking to which all gas in field is sold. Formerly under Scottish ownership and management, the fields' present Canadian-American owners were saddled with a very long-term contract that set gas price at 5s. 5d. per 1,000 cu.ft. Measurement of gas was arrived at by aggregating readings of customers' meters and undertaking paid on that total! As a consequence, there was no need for economic concern with unaccounted-for gas. It must have been substantial, based upon surface indications of leakage and time-to-time explosions.

B. C. Electric Company Ltd., Vancouver, reports central forced-air gas furnaces sold in 1957 are tripling the number sold in 1956.

What in the World . . . ?

Look for a rash of new decor on gasholders in America, to follow the lead set by Savannah Gas Company in Georgia with a colourful global treatment on its new 60-ft. holder. That should inspire, inevitably, painting a Florida holder as an orange, or will a California undertaking do it first? A golf ball will appear in North Carolina, almost certainly. And, of course, there is no question about Milwaukee Gas Light Company mounting a baseball atop a bat. The Savannah gasholder, hard by well-preserved walls of royal gardens established by General James Edward Oglethorpe after founding the city in 1733, has a capacity of 600,000 cu.ft. at a pressure of 75 lb.

From a paper to the London and Southern Section of the I.G.E., October 22, 1957.

The Influence on Purification Processes of Some Modern Developments in the Gas Industry

By F. H. COPE, M.Inst.Gas E.,

DEPUTY STATION ENGINEER, EAST GREENWICH WORKS.

SOUTH EASTERN GAS BOARD.

THERE are two matters which have been almost entirely neglected by investigators into the reactions taking place in purifiers and these are (1) the influence of adulterants, (2) the kinetics of the process, both on a quantitative basis.

The estimation of H_2S in foul gas is very widely done by the oxidation reaction employing iodine, though most chemists are prepared to admit that the method allows of some inaccuracy.

Recent developments at East Greenwich revived interest in the dry purification process and it became necessary to get better estimates and predictions of plant performance, under a variety of conditions. The dependability of the iodine test was re-examined, since it was deemed better not to enter on analytical procedures using other re-actions, but to devise checks to be carried out using the same re-action, the same apparatus and the same techniques, which were employed in the day to day control tests. The retention of the iodine test method seemed desirable on account of its speed and comparative simplicity.

Real Interference

To find out whether the interference by cyanogen is a re-action whose velocity approaches so closely to the speed of the oxidation of H_2S that in the brief time occupied by an H_2S determination on the purifiers, it would really interfere, a weak, slightly acidified solution of potassium cyanide was introduced into a bubbling bottle and clean blue water gas was bubbled through the solution. A sample was drawn off into the Somerville apparatus used for H_2S determination and charged with some iodine solution. It was at once evident that the re-action is comparable in velocity to the H_2S re-action and must be accepted as a real interference with the iodine test.

A stream of foul coke oven gas was then passed through a tower charged with moistened lead carbonate supported on moistened sawdust, the mass being intimately mixed together. The issuing stream of gas freed from H_2S was sampled and tested for H_2S, using the iodine test with the same standard solution, starch indicator, apparatus and technique which would have been used for an H_2S control test on the plant. Tests were carried out simultaneously on the foul gas entering the lead carbonate tower.

The iodine titre on the H_2S free gas was 15% of the titre on the foul gas. The magnitude of the error is very close indeed to a value which would explain the apparent deficit in sulphur which is a common feature of purification by iron oxide. To complete the comparison, water gas was examined in the same way and gave a negative result after passing through the lead carbonate tower. This does not mean an entire absence of re-action, but if any re-action takes place at all it will be slow and of insufficient magnitude to introduce a serious error under the conditions which normally apply in making the iodine test. Another source of error in the iodine test for H_2S as applied to coal gas is attributed to interaction between iodine and unsaturated constituents of the gas.

It was found that if clean town gas be passed through a test a considerable titre is obtained, equivalent to an apparent concentration in H_2S of 30 to 40 grains, per 100 cu.ft.

If, however, a stream of clean town gas be passed through a tower packed with active charcoal and iodine tests carried out on the gas entering and leaving the active charcoal, it will be found that there is an apparent content of H_2S on the inlet but a negative result is shown on the outlet gas as was found when purified producer gas or blue water gas were tested against iodine.

The inference to be drawn from these tests done under restricted conditions indicates quite clearly that the iodine determinations of H_2S are constantly high due to the interference caused by the presence of HCN and unsaturated constituents in the gas. For straight coke oven gas as made at East Greenwich, the weight of sulphur to be absorbed from the gas is only 80-85% of that which is calculated from the iodine tests used in unrestricted conditions for the daily control tests.

Under modern conditions dry purification is being extended to include the treatment direct of undiluted coke oven gas rich in HCN and unsaturated compounds and also the treatment of gases obtained by new processes containing no cyanides at all, but much lower concentrations of hydrogen sulphide. In order to predict results and interpret differences the more accurate assessment of the quantities of the various impurities to be removed will be of great importance. It is desirable, therefore, to discuss the influence of hydrogen cyanide on a quantitative basis.

This was emphasised when a purifier installation treating entirely the undiluted coal gas from a coke oven plant making hard metallurgical coke was investigated. Here the cracking conditions favour the production of cyanides to a greater degree than in gas works carbonisation. The load on the purifier installation was high and commanded a great deal of interest when considered against a background of gasworks experience in purification. The explanation proved to be that the spent oxide produced regularly contained so much prussian blue that it was saleable without working up to a high sulphur content. As a result the working life of the charges was shorter and the weight of new material higher than is allowable when spent oxide is sold on its sulphur content, and this factor helped materially in achieving high loading.

The quantities involved are illustrated in the following details obtained on the tower purifiers at East Greenwich treating mainly coal gas from coke ovens making domestic coke so that cracking conditions are not unduly severe.

Marked Improvement

When testing three charges of fully spent artificial oxide which had been taken from a stream of tower purifiers treating coke oven gas, they were found to contain an average of 5.8% prussian blue, the maximum being 6.3% and the minimum 5.4%. The average sulphur content of the spent oxide on the dry basis was 52.5% by the CS_2 extraction method while the original artificial oxide contained on the average 38% Fe_2O_3. The aggregate dry weight of the fresh oxide was 376 tons and the aggregate weight of the discharged spent material was 945 tons dry.

From the above:—

Dry Fe_2O_3 Charged	=	143 tons
Dry prussian blue in spent oxide	=	54.7 tons
Fe_2O_3 equivalent of the prussian blue $Fe_4(Fe(CN)_6)_3$.	=	35.6 tons
Proportion of original Fe_2O_3 converted to blue	=	25.0% approx.

F. J. Dent and L. A. Moignard, have shown that spent oxide from which the sulphur had been leached by a solvent

underwent a marked improvement in activity when the residual 'blue' had been removed by the action of alkali and consider that the formation of 'blue' was detrimental to the activity of purifying material. Whether or not 'blue' interferes with the activity of oxide by creating some kind of barrier hindering the access of H_2S to the iron, it is of marked interest to find on working out the quantities that, for the conditions in the system described, a quarter of the iron oxide has been 'locked up' in prussian blue. It is not impossible that the iron released from the prussian blue, by attack with an alkaline leach, could be in a very active form and fine texture, and since the proportion is so high, the resulting 'rejuvenated' oxide would possess remarkably high activity. It is known that 'blues' are active oxygen carriers in the liquid purification process and they may, to a small extent, act in the same way in the dry process if plenty of moisture is present in the purifying material. Activity of this kind might furnish an explanation of the small zones of very intense dark blue which occur here and there in freshly discharged spent or partly spent material. However, it seems on the whole, that prussian blue is not an asset in re-acting oxide.

The worst condition which will arise in practice is that in which sufficient cyanide is fixed to be detrimental to the process, while being just insufficient to render the spent oxide attractive on the basis of prussian blue content. It is of interest to work out the quantitative significance of cyanide fixation.

If 100 dry tons of purifying material were exposed and gained nothing but sulphur until the sulphur content reached 50% then the dry weight of the spent material would be 200 tons. On the assumption that ten tons of cyanogen had been fixed during the absorption of 100 tons of sulphur, the net gain in weight of the material due to the formation of prussian blue would be 6.4 tons, allowing for the displacement of oxygen from the iron oxide, and the sulphur fraction would then work out at 48.8% with the material containing 8.75% prussian blue. How much more sulphur must be picked up before the sulphur fraction is raised to 50%?

If S and S_1 be the respective weights of sulphur picked up (a) when no adulteration occurs and (b) when the total increase in weight is 1.064 times the weight of sulphur as obtained above, and A is the weight of dry new oxide, then

$$\frac{S}{A + S} = \frac{S_1}{A + 1.064S_1} = 0.5 \text{ (sulphur fraction)}$$

$$\therefore S_1 = 1.07\,A + S = A$$

$$\text{Then } \frac{S_1}{S} = \frac{2.14.}{2}$$

The adulteration to this extent, therefore, compels one to purify 7% more gas to reach a given sulphur content, although the sulphur fraction has only been raised from 48.8% to 50%.

Two other forms of adulteration accompanied by a virtual loss of active iron arise from the decomposition of the iron sulphides when the temperature of the reacting oxide is too high, and the fixation of sulphur and oxygen as sulphates, also associated with high temperature and the effects can be calculated on lines similar to those already presented for cyanide.

The evaluation of spent oxide is generally made on a wet basis and credit is only given for sulphur which is extractable in carbon bisulphide so that any sulphur recovered in other forms must be classed as an adulterant.

Kinetics of the Process

It has been suggested that the removal of H_2S by iron oxide involves all three phases, but whether this is true or not, it is obvious that it involves at least two—the solid and the gaseous.

The study of reaction processes, in the present state of knowledge, is difficult even in homogeneous systems as illustrated by the fact that many common gaseous reactions do not follow simple reaction orders, and heterogeneous reactions are almost entirely unclassified. It is therefore not surprising that this aspect of dry purification is almost unexplored, and the relations of the dimensions of oxide beds, overall depth of oxide, and gas velocities exposed in a stream are rarely discussed.

The need to know more of these matters was felt at East Greenwich in the period which followed the first installation of tower purifiers, prior to which, the whole of the gas purification at East Greenwich was carried out in downward flow boxes containing three feet of oxide in each box, disposed in two or three layers, and with four or five rotational boxes 70 ft. by 30 ft. in each of six streams. No water-gas was manufactured at East Greenwich until the end of 1951, and the producer gas used to dilute the coal gas was distributed approximately proportionately to the coal gas flow in the separate streams, so that there was no direct experience of purification of gas with low H_2S content. The tower purifiers were of the divided flow type, five rotational towers containing 28 parallel layers of 17 in. depth of oxide, so that the aggregate depth of oxide was 7 ft. 1 in., compared with 12 or 15 ft. in the box streams. When the load on the towers was twice the load on a box stream the R values respectively were equal.

Something Fundamental

Daily backward rotation was practised in each case and similar material and methods were used. After a few months a general pattern of performance emerged, and it was apparent that the extraction of H_2S per cu.ft. of purifying space was being performed less effectively than in the old boxes. To deal with this problem the manipulation of the charges was most carefully controlled, samples were returned to the Divisional Laboratory and reported as normal, and after every care had been taken the performance could not be brought up equal to that of the boxes.

At this stage it became clear that something fundamental was involved, and the literature was searched for any reports that might help. At the same time some speculative thought was given to the problem on the works, and the conclusion was reached that the process is fundamentally logarithmic in character, though this is susceptible to considerable modification for various reasons.

G. U. Hopton has published two important results found by experiment, and it is surprising that this work has not been more widely recognised. He stated that the slip of H_2S in a system was independent of the ingoing H_2S content.

In a paper by J. L. Ireland on 'Divided Flow Purification,' published in the Joint Proceedings of the Junior Gas Association, he makes some interesting points.

The plant under investigation consists of two overhead streams of box purifiers 40 ft. by 30 ft. by 6 ft. The 'A' stream, constructed in 1932, employed downward flow through two beds of oxide in series in each box of 1 ft. 3 in. and 2 ft. 6 in. depth respectively. The 'B' stream constructed in 1950, employed divided flow through equal layers 1 ft. 9 in. in depth. The 'B' stream with divided flow slipped H_2S. It was, therefore, decided to work up old oxide in the 'A' stream which gave no trouble. This is confirmed by the experience at East Greenwich where on a number of occasions charges which were working up very slowly in the towers were withdrawn and finished in the box purifiers.

Experiments were then organised to find the effect of the depth of layer. Equal volumes of the same foul gas were purified experimentally in equal quantities of similar oxide arranged in the one case D in. deep, and in the other ½D in. deep. This means that the apparent linear velocities were in the ratio 2:1, but the times of exposure equal. Successive foulings were performed and finally the total sulphur gained was determined separately in each layer. The performance of the deeper layer was consistently better than of the half-depth layers, and five further foulings were needed with the shallow layers to fix as much as was fixed by four foulings using the deep layers.

The superiority of deep over shallow layers is confirmed by R. G. Warr and E. T. Pickering, who refer to experiments with 15 in. and 30 in. layers in model purifiers. A graph was produced showing that at the higher R values and with a H_2S content in the region of 500 grains per 100 cu.ft. the efficiencies of H_2S removal were respectively 78% and 95%.

They also reported that where the containers were modified to allow of a deep single downward flow layer, the extraction of H_2S was superior to that obtained in the split flow layers under similar conditions.

With the introduction of new materials and processes the proportion of gas made having a relatively low proportion

of H_2S may be expected to increase, and it is possible that some gas making stations will produce such gas almost entirely. It may be interesting to attempt a prediction of the course of dry purification in such circumstances. It is suggested here that the process being logarithmic in character this basis will persist, and as a first approach we could calculate the results, assuming that the expression found by Hopton holds good.

Depth of Bed

Consider two cases where the H_2S concentrations were respectively 1% and 0.1%. In the first case the gas was passed through 120 in. of purifying material to reduce the H_2S concentration to 1 p.p.m. The temperatures were equal in both cases and the removal of H_2S was proportional only to the concentrations in the gas, the active mass of the oxide being constant.

The first question to be answered is after what depth of bed would the low H_2S gas reach the desired exit concentration of 1 p.p.m. Taking C as the initial concentration, and C_1 as the exit concentration of H_2S, the reaction would (ideally) be represented by the equation:—

$$C_1 = Ce^{-kd}$$

where d is the depth of the layers and k is an 'activity coefficient.'

Solution of the equation shows that in such an ideal process, 90% of H_2S in a gas initially containing 1% of the impurity, would have been removed at the thirtieth inch, so that with the same activity coefficient and gas velocity, it is apparent that if the gas initially contained 0.1% of the impurity by volume, the depth of reaction bed required to reduce this to 1 p.p.m. is three-quarters of the depth required for the gas containing 1% H_2S. Assuming the full depth of purifying material is retained, by how much can the gas rate be increased without exceeding an exit concentration of 1 p.p.m.?

This is less straightforward. It can be shown that, for an ideal reaction following logarithmic law, a change in gas rate would alter the slip of H_2S in accordance with the expression

$$\frac{S}{S_1} = \frac{(V)}{(V_1)}^{-1.0}$$

However, Hopton's expression found by experiment, gave the power index of $\frac{(V)}{(V_1)}$ as -0.6. This departure is of challenging interest, for if graphs are prepared it is found that the experimental result is a good deal better than the hypothetical, and that the slip rises less rapidly with volume than is calculated on the assumption that H_2S concentration is the only factor controlling the instantaneous reaction rate. A possible explanation is that the increased velocity itself assists the mass transfer of sulphur by increasing the diffusion of H_2S to reacting surfaces. The calculation shows that the gas rate could be increased by 61%. Naturally, such a result would be dependent upon sustaining reaction temperature at the same level in both cases, otherwise, at the lower concentration, the 'activity coefficient' would fall (and performance with it), but this aspect will be dealt with more fully later in the paper.

In contrast with this disparity attendant upon changes in gas rate Hopton's second result, namely, that the slip of H_2S is independent of the inlet concentration of H_2S, is in exact agreement with the ideal expression:—

$$C_1 = Ce^{-kd}$$

Here, the gas rate is maintained constant, and so long as the experiments are carried out at a reasonably constant temperature, it appears that the reaction is then controlled almost entirely by the H_2S concentration at any point in the beds.

It is reasonable to expect that fuel gases produced by alternative processes and low in H_2S would contain no HCN, and further, that, since the intensity of the reaction would be much lower giving more equable temperature distribution, undesirable side reactions would be greatly curtailed. Both of these conditions by reducing adulterants would virtually improve the activity coefficient, and it is safe to assume that the 61% would be nearer 100% in practice, though the weight of fresh oxide per ton of sulphur recovered would rise.

The foregoing conclusions are only valid on the assumption that an attempt is being made to produce saleable oxide containing 50% sulphur on a dry basis. Other practical points emerge. For instance, the purifying material would have to remain in service five times as long and exposure up to six of seven years would not be unlikely. Exposures of this duration have been obtained in certain conditions in the past, but are only possible when the moisture content of the material can be held within suitable limits. Another consideration of importance is that with such slow working the final drying of oxide would be difficult. Spent oxide ought to be as dry as is consistent with the process efficiency because any excess moisture which it contains, has a detrimental effect on the subsequent process of sulphuric acid manufacture.

The most difficult factor to assess is the alteration in the active mass of the beds of purifying material arising from the different rates of reaction of sulphiding and oxidation of the iron. This is especially true when air is not admitted to the first taker. As a result the first taker falls off in performance, due to a portion of the material becoming sulphided and thus losing activity altogether until rotation takes place. Up to the present this problem has proved too intractable to be formulated by any equation, but some approximate estimates can be arrived at by considering working results.

If the volume of oxide in a purifier be taken at 150 cu. yd., and the bulk density of the new material as laid as .55 tons per cu. yd., the weight of the new charge will be 82.5 tons wet, of which 25 tons could be Fe_2O_3, H_2O, and 14.3 tons of H_2S would be required to foul the iron to ferric sulphide completely. At an R value of 40, the daily gas rate through such a box would be 3.88 mill. cu.ft. At 600 grains per 100 cu.ft., this gas would carry about 1.5 tons of H_2S into the box per day. Thus, quite apart from revivification *in situ*, a box of new material put as first taker has a potential of nine consecutive days' gain of sulphur before being completely sulphided. In practice nothing nearly approaching this can be attained for two reasons, (a) the contact is very poor, and (b) as the concentration of H_2S is lowered in passing through successive elements in a bed the reaction rate falls off.

At the other end of the scale, when a charge is approaching a spent condition it is not uncommon for it to be unable at the end of a 24 hour period, to remove more than 25% of the ingoing H_2S which means that the first taker has become ineffective. The gas must, however, be cleaned from H_2S continuously and so the total depth of oxide in a stream must be great enough to allow for the periodic loss of the first taker's activity.

Purification on Base Load

By contrast, if gas which is very dilute in H_2S is being purified with regular rotation of the vessels, this effect will be almost non-existent as is confirmed by numerous investigators, and in ordinary practice a poor charge will remove small quantities of H_2S in an ordinary coal gas stream very nearly as well as a good new charge in a similar position can do. Consequently, the assessment made a little earlier that a reduction in ingoing concentration from 1% to 0.1% would need three-quarters of the total depth of oxide must be modified, and a further one-quarter may safely be cut out. Even so, when treating gas with 0.1% H_2S the ratio of size of an installation to weight of sulphur extracted would be five times as great as in a plant treating gas with 1% sulphur.

Modern development in the carbonising industry has led to purification on base load. Huge installations are being erected to deal with coal gas from coke oven plants, of which the output is decided not by seasonal changes in gas demand, but by a continuous high load to meet coke demand. There is thus no respite given to the purification plant. The H_2S content of the gas is higher than the mean on the gasworks, cyanides are higher giving rise to adulteration and except in special cases where oxide can be disposed of for cyanide recovery, this is a serious disadvantage. There is, therefore, a considerable risk that ratings which proved suitable under the variable loading in the gas industry will prove, in the long run, quite unsuitable to base load needs.

Temperature effects will be dealt with in a subsequent section and for the present, attention will be confined to an aspect which is closely linked with the discussion on 'kinetics.'

If the process were continuous and countercurrent it would be a great deal easier to decide this issue, but unfortunately the difference in velocity of the sulphiding and oxidising reactions makes this impossible by introducing the need to rest

vessels for revivification by rotation. Even so the difficulty would not be serious if the activity of a charge could be restored by each revivification back to its initial value, but this is not the case.

A study of the situation shows that the interruptions to continuity caused by rotation easily leads to a state of affairs where the rate of growth of the sulphur fraction in the new and stronger charges exceeds so greatly the growth in old charges, that the gradation of sulphur is completely disorganised, and the whole system arrives at a state of confusion. It can be shown that the rate of growth of the sulphur *fraction* at the commencement of the exposure of a tower can vary between 15 and 20 times the rate of growth at the end of its exposure.

A method has often been used to counter this by leaving weaker charges in the first taker position proportionately longer than others, but reflection will show that this is only really effective at times when loads are off peak, and for dealing with high base loads successfully such a palliative is of little use.

Calculation shows that for a simple perfect reaction, a charge must acquire 33⅓% sulphur to have picked up half the quantity of sulphur which it must gain throughout its full life, but where adulteration is present this may be pushed up to 37.5%. It is also easy to prove that the rate of growth of the sulphur *fraction* for a *constant* gain in weight of sulphur declines as the bed fouls. But the gain in weight also declines with exposure, and the two facts taken together, result in a parcel of oxide having to spend a longer period of exposure as a weak charge, than it can do as a good charge. This effect can be successfully matched by manipulation of the contents of a purifier stream under seasonal variation of load, but this is impossible with continuous loading. It can be shown that the average sulphur contained in one day's work at the nominal rating of 12 mill. cu.ft. per day of gas containing 600 grains per 100 cu.ft. of H_2S.

'Working Up' the Oxide

Observation on a stream of tower purifiers led to the conclusion that the average daily gain of sulphur per tower, per rotation, was about 3½ tons, and this is equivalent to 10 mill. cu.ft. of gas per day in a stream which was nominally rated at 12 mill., which had been pushed up to 16 mill. cu.ft. per day maximum, and had purified for three months an average of 14.7 mill. cu.ft. per day. The high loadings were met by increasing the amount of new material put into use, but this had to be offset by 'working up' the oxide at times of low loads. In the early autumn it is common at East Greenwich to find the average sulphur content of the whole of the material in use in the stream to be about 47.0%.

At the time the tower purifiers were chosen at Wandsworth there was only experience of their working in Germany to go on, so it had to be decided how the difference in H_2S concentration in England and Germany were to be allowed for in design. The restrictions, too, on H_2S in town gas are less onerous in Germany than in England. There were the alternatives of retaining four vessels and increasing their size, or of adding further vessels in series.

The latter method was selected, and the reasons given for the decision were: (1) An increase in dimensions of the towers would have introduced structural and mechanical difficulties around the weight and stiffness of the trays, the span, lifting power, and speed of the gantry crane; (2) with six vessels only one-sixth of the capacity of the plant is out of commission while changing a charge is in progress.

While there is little doubt that a reduction in cross section, and increase in gas velocity, is a great aid to transfer of sulphur in uniflow systems, it is not at all clear that, with rotation of vessels, additional vessels in series in a stream are as good as might at first be thought, as a means of increasing the flow through a system.

There is no doubt that four vessels in a stream for ordinary good work is a minimum, and the arrangement accommodates the slowness of the oxidation compared with sulphiding in about the right proportion. After this basic need has been met, the more vessels are in series the shorter is the time which each can spend as first taker.

Modern developments in the shape of tower purifiers have introduced complications into temperature and humidity control. This is a complex but very interesting aspect of purification technique.

The original installation of tower purifiers designed by Dr. Lenze for the Thyssensche Gas Und Wasserwerke, were intended for the treatment of more or less continuous loads of gas, containing not more than 300 grains per 100 cu.ft. of H_2S. Four towers were provided in a stream, and four such streams were rated at a combined throughput of 42 mill. cu.ft. per day of gas containing 260 to 300 grains H_2S per 100 cu.ft.

When the installation of tower purifiers at Wandsworth was designed, the number of vessels in a stream increased from four to six, to deal with gas of about twice the H_2S content but, at the same time the number of trays in each tower was reduced to 12 instead of 14, as in the German installation. Thus the area per vessel was reduced by one seventh, and the total depth of oxide in the stream increased by 50%, while the total volume of purifying material was increased by 28.6% contained in 72 containers at Wandsworth, as against 56 in the Thyssen plant, to deal with 10 mill. cu.ft. gas per day. Cast iron radiators were in both these cases installed in the bases of the towers to allow of gas temperature adjustments.

The first set of towers erected at East Greenwich comprised five rotational vessels, and a catch vessel, and the dimensions of the vessels were the same as the original installation in Germany, with 14 containers in each tower. The plant was considered capable of purifying 12 mill. cu.ft. of coal gas per day, with 600 grains H_2S per 100 cu.ft. and of working up a reasonably active oxide in two exposures. Since the catch tower contributes nothing to heat loss in the process, the ratio of surface to load had again moved downwards, the surface being only 25% greater than the Thyssen Plant, while the load was 140% greater in terms of sulphur removal.

The installation erected at the Nechells Works at Birmingham was rated at 12 mill. cu.ft. per day, and had six rotational towers in each stream again with 14 containers per tower. However, the H_2S content of the gas varied between 500 and 950 grains per 100 cu.ft. and during a typical week it is reported to have averaged 700 grains. The surface had been increased by 50%, and the load by 180% in terms of sulphur removal.

The significance of these figures depends very largely on the climatic conditions prevailing at the time. There is much less difference between summer air temperatures and the useful working temperature of purifiers than between the latter and winter temperatures, and in winter air movement is usually much more marked, promoting heat transfer very vigorously.

Observations were made in March, 1955, when the average air temperature at East Greenwich Works was 35°F., and winds were fresh to moderate from a North Easterly direction.

The towers were receiving steam at the approximate rate of 1,000 lb. per hour. The loss of heat due to the cooling of the gas is unimportant but the heat in the steam and heat of formation are high thus.

Loss of Gas Temp. (Sat.)	70,000 B.Th.U. per hour
Heat in added steam ...	1.1 mill. B.Th.U. per hour
Heat of reaction ...	1.3 mill. B.Th.U. per hour
Total heat loss ...	2.47 mill. B.Th.U. per hour

This loss reduces to a transfer of 4.1 B.Th.U. per sq. ft. of tower surface per hour per degree F., and is about double the rate obtainable from flat surfaces, of lesser height and not exposed to strong cross currents. L. A. Moignard has spoken of heat losses of 20 to 100 therms per day for a 5 mill. stream, but here we have a loss of the order of 600 therms per day, for 12 mill. cu.ft.

Bearing on Future Design

Having indicated the magnitude of heat losses which may occur in one type of tower purifier, it may be interesting to report how an extreme case has been dealt with by German technologists, and this has a bearing on possible future design of purifier installations, which may have to treat gas containing low concentrations of H_2S resulting from the development of newer manufacturing processes. Earlier in this paper, it was shown that, where gas of low content in H_2S has to be purified by the oxide process, the size of the installation (and therefore its surface) will increase in relation to the weight of sulphur to be removed, and at a moderate estimate would be five times as great; the heat losses being affected proportionately.

At Mariendorf, Berlin, coke oven gas containing some 500

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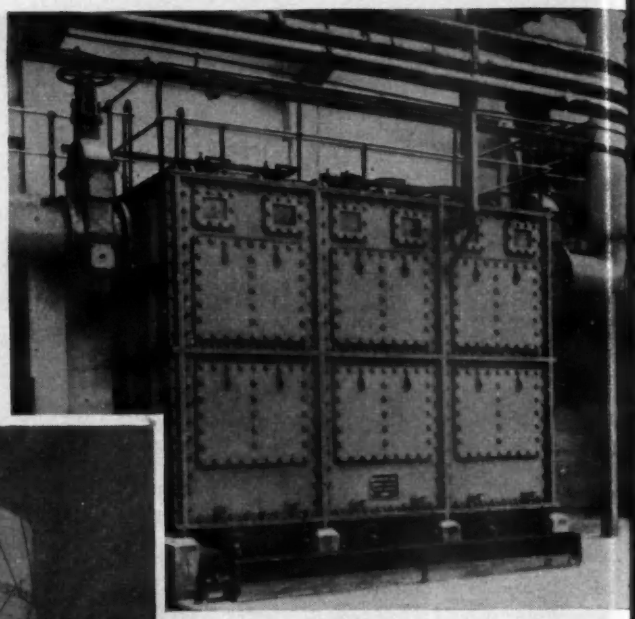

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grains per 100 cu.ft. of H_2S is first treated in a Collin type wet extraction plant, lowering the H_2S content to about 100 grains per 100 cu.ft. and is followed by a final purification by iron oxide in tower purifiers. The installation of towers is completely enclosed in a substantial building with sectional roof. The crane is carried on the main frame of the building, and to change a tower a section of the roof is first lifted and parked, followed by the raising of the lid of a vessel unit, and this also is parked on the roof of the building. Inside the building steam unit heaters are provided to raise the air temperature surrounding the purifiers to the desired level in cold weather.

No doubt the German technologists decided to have full technical control of the process, and possibly are disgusted with the clumsy, dirty, laborious oxide process, with its temperamental vagaries. In this system the oxide is exposed only once, and there is no market for the material rejected from the process.

Much has been written about the heat transfer from purifier installations, but it has always dealt with externals such as surface area, housing, and insulation, and is mostly concerned with keeping up reaction temperature. The vessels have been treated as a warm body losing heat by radiation and convection but, except for the general observation reported by Warr and Pickering, that, oxide near to the periphery and the centre tube of the containers appeared to have worked more normally than that in other locations in tower containers, no attention has been given to the manner in which heat leaves the reaction zone itself.

The view is put forward here that in addition to warming the gas and increasing its moisture content, heat transfers on an appreciable scale occur by other means, including: (1) the flow of heat by conduction from warmer to cooler regions in the beds of material; (2) by convection in the substantial gas spaces under the covers of boxes and beneath the lowest grids; (3) by radiation from the beds to the outer surface of the containers; and (4) by the return of condensate to the charges.

If then purifying vessels are altered so that there is no geometrical similarity whatever between two different types, the behaviour will probably change radically.

Temperatures in the reaction beds at East Greenwich were observed by laying a group of thermocouples in a container, the multi-core cable being brought out through a suitable gland and, in summer conditions, a maximum temperature recorded in these containers reached 130°F. when the load was 8 mill. cu.ft. per day, i.e., at two thirds of the nominal rating and an R value of 27 accompanied by a 28°F. rise over one vessel in the set of five rotational towers.

Fortunately these effects have been largely offset at East Greenwich by the fact that the proportion of diluent gas of lower H_2S content has risen continually for some years, and will continue to do so for some time. Although the coal gas and diluent gases are purified and measured separately the various units of plant can be variously deployed, so that when the amount of diluent gases and some of the coal gas production is reduced with seasonal reduction in the demand, the loading of the purification plants is moderated by spreading the smaller loads over the whole area, an advantage not available to installations working on true base loads.

DISCUSSION

Mr. W. J. H. Jordan (Wallington) said that much research had been done and many investigations had been made in connection with the problems of oxide purification but no easy methods had yet been evolved for the efficient control of the process under the varying conditions that arose from time to time. In fact purifiers were often operated in a rather haphazard manner. If the process was viewed from basic principles there were three main points for consideration: 1. The effective removal of H_2S; 2. the production of a spent material with a sulphur content as high as possible in order to obtain the best price for the fouled oxide, this economic aspect inferring the minimum number of foulings; 3. the differential pressure across the streams should be maintained as low as possible.

In order to remove H_2S effectively, testing for H_2S along the streams was essential. Mr. Cope had dealt with the objections to the iodine test at some length but this need not necessarily detract from the usefulness of the test. If it was desired to calculate accurately the quantity of sulphur deposited in a charge, the iodine test would probably not be used—or, if it were used, the necessary correction for HCN would be determined and applied as this was part of the standard iodine test. On the other hand, there was no need to correct for HCN when the test is used to control a process where various factors could be far from constant.

He found the section of the paper comparing deep layers of oxide and high gas velocities with shallow layers and their corresponding low velocities of great interest. Tower purifiers were in the latter category and although it had been suggested that the design of towers could be improved, those at Wandsworth had behaved very well indeed. Although during the greater part of the year the volumes dealt with are lower than the rated capacity of the streams, during the peak gasmaking period the plant would treat efficiently about 1.3 times the rated volume capacity, at least for short periods.

Referring to base load purification, there was much in Mr. Cope's contention that ideas of stream capacity might have to be modified in order to handle the maximum gas loading continuously, but there was no doubt that the periods of recovery afforded by warmer weather and lower gas demand could be very helpful. However, it should not be impossible to purify continuously the rated capacity of a stream of purifiers. The important conditions involved here were undoubtedly (a) six rotating towers, and (b) relatively low H_2S concentration in gas at the inlet to the towers, as had been mentioned earlier. He was quite sure that the importance of the latter condition could be over emphasised.

The Only Way

Referring to the rate of sulphur deposition in strong and weak boxes and the palliative of leaving the weaker box in first position for a longer time, he thought that this was the only way to ensure a high sulphur content of spent material with a minimum number of foulings. The method was easier to apply when a weak purifier is followed by a strong purifier.

Commenting on the section dealing with the number of vessels in series, where the author had expressed the opinion that given 12 vessels, he would prefer three sets of four purifiers rather than two sets of six, he was unable to agree with Mr. Cope for the following reasons: (1) When a purifier was off stream for discharge, in the case of a four-box stream 25% of the purifying capacity is lost, while with a six-box stream only 16⅔% is lost; (2) In order to rotate purifiers, the outlet of the last box but one in the stream should be clean. This would apply to both four-box and six-box streams. Therefore, on a four-box stream, H_2S could only be permitted at the first two outlets, whereas with a six-box stream H_2S could be permitted up to the fourth outlet.

Mr. **W. B. S. Newling** (Fulham Research Laboratory) said that as a fairly advanced student of liquid purification, he was of the opinion that the best available method of purification was a well-designed tower or tower-box system driven hard. He asked how this could be done and suggested four axioms. The first was that the statutory limit of gas purity was a nuisance. The removal of the last traces of hydrogen sulphide was too severe a duty for the main purifiers and it should be left to a specialised catch-purification system which might be one of two kinds. One method was to wash the gas with a suspension of basic zinc carbonate in soda solution, which was a most promising process for final purification of coal gas, but was not relevant to this discussion. The other method employed iron oxide but in a manner quite different from ordinary purification. The oxide must be alkaline, free from liquid water, but it must be in contact with almost saturated gas so that it contained about 10% of adsorbed water. This gave the maximum surface covered with an alkaline layer of adsorbed water which acted as the absorbant in the manner which was now becoming familiar as partition chromatography; the additional backing of iron oxide made the absorption irreversible. Not much sulphur could be accumulated on oxide in this way because there was no liquid water to act as the medium for the migration of the iron to the outside of the sulphur.

His second axiom was that liquid water must *always* be present in *all parts* of the oxide in the main purifiers to ensure migration of iron and to act as an evaporative coolant absorbing the heat of the purification reactions. A good choice of

oxide would permit the charge to start with a high percentage of water, and a highly mechanised handling system made possible the relatively frequent removal and re-wetting of the charge. The gas entering the set must be saturated, otherwise water would be lost unusefully from places where there was no exothermic reaction. Excessively localised generation of heat was the cause of local drying out of the mass and the consequent loss of activity but local high temperatures would not have time to develop if the purifiers were swung very frequently. This called for power-operated valves and might only be sound practice if there was a separate catch-purification system. Otherwise the prevention of local hot zones depended on good practice in air admission.

His third axiom was therefore that the air should be added at the inlet of the second taker, and his fourth axiom was that the proportion of air added should be as low as could safely be permitted; this was only possible with a good catch-purification system.

At Southall, a flow-ratio controller had been installed as an experiment to fix the proportion of added air; the evidence of its success was that nobody meddled with it and that the oxygen concentration in the purified gas was consistently lower than in earlier practice. On the same set there was a magnetic oxygen analyser recording the oxygen concentration in the purified gas. With the first-taker air admission and oxygen slip of about 0.7%, the same slip was observed a very short time after the daily rotation of the set, but with second-taker admission of about the same proportion of air, oxygen slip was negligible for some time after swinging and reached the steady value of about 0.7% after about five hours. With less air added, all to the second taker, the slip was measurable after swinging but took about 10 hours to reach a steady value of 0.5%.

In his opinion less air should be added to give more hours of low oxygen slip, but it is doubtful whether this would be good practice without a catch purifier. Mechanised tower systems should be operated at much higher than normal loads in accordance with these principles, and should be freed from the need to give gas of statutory purity by the provision of a good catch-purifier system.

The Contamination Process

Mr. J. C. Hogg (Bournemouth) thought that a study of the contamination process by the HCN more important than a discussion over the use of four or six boxes. He described an experiment of passing gas through an asbestos tube of 6 in. diameter in series with deep box purifiers at the same R value. There was a break through in the boxes after four days but in the tube there was no breakthrough before 30 days. The box had become contaminated by HCN.

He thought the dissipation of heat was of interest and pointed out that smaller layers gave out more heat. Loss of moisture from oxide was of very great importance and it was impossible to replace it in bulk where it was needed. This also applied to steaming, which had an overall effect and was not selective. If HCN was removed before the boxes, was there any improvement in performance?

Mr. L. R. Meek (Horseley Bridge and Thomas Piggott Ltd.) said that Mr. Cope's remarks on temperature control and the need to dissipate heat in winter were of particular interest, but there was no universal agreement on this matter. On the Continent purifier plants were housed, but this was too expensive. He thought that layer depth should be increased from 15 in. in some plants to 27 in. In the North Thames Gas Board the layer depths were 2 ft. 9 in.

This might be the limit due to unduly high back pressures. He asked what in Mr. Cope's view were the maximum layer depths.

Mr. R. Bairstow (Bow Common) said that in view of the rather disappointing performance of tower purifiers, viz., poor first box efficiency and the slowness of towers at the outlet end of the stream to clean up, he could not agree with Mr. Cope's suggestion that future plants should be erected with only four towers in the stream. Tower purifiers had the great advantage that the oxide could be handled mechanically and it was up to both the operators and makers of this type of plant to find a way to work them as efficiently as the old box type purifiers for the removal of H_2S. The Germans had given us a very good idea, but it was up to the British to improve on this and to adapt it to suit British conditions. This could be done if each tower were divided, by sealing the top half from the bottom, in such a way that the gas would flow in series through the two halves. By doing this the depth of oxide through which the gas would travel would immediately be doubled and this would improve their performance as proved in Mr. Cope's paper. It would also retain the sulphur nearer the inlet of the stream, which was also advocated by Mr. Cope. Admittedly, close clearances for the removal and replacement of trays would be involved, but this was a design problem which could be overcome. Another criticism of this proposal was that the back pressure thrown by the towers would be increased, but as this at present was quite low, this disadvantage would be outweighed by the advantages gained.

Replying, **Mr. Cope** said he did not agree with six boxes in series, but preferred four boxes or at the very most five boxes. With six boxes very careful calculations were necessary. Three streams of four boxes were always better than two of six, especially when a box had to be changed and taken out of service, since it was so much easier to shunt volumes of gas into alternative streams. He was very interested in Mr. Newling's contribution and agreed that absorbed water had a most important effect on the condition of the oxide and its ability to absorb sulphur. This point should be developed. His experience with steaming was short but the indiscriminate use of steam had a very definite effect on the oxide.

Referring to the point at which air should be admitted to the purifier plant, he said that it should enter the first box when C.W.G. was being treated but the second box of a coal gas purification plant. Sometimes the air supply to the coal gas plant was split, some entering the first box and some the second. There was sometimes trouble caused by inefficient air compressors. Under these conditions of air admission, there was an oxygen slip in the purified gas of .4%.

Dealing with Mr. Bairstow's reference to the remark in the paper of 1 p.p.m. of H_2S in purified gas, Mr. Cope said that it had only been given as an example and was not permitted. On the whole the performance of tower purifiers was sometimes disappointing but they must be made to work.

Replying to Mr. Hogg, Mr. Cope pointed out that coke oven gas as produced at East Greenwich contained 15 grains of HCN per 100 cu.ft. and 10% of sulphur. During the purification process the weight of the dry mass was increasing rapidly though efficient absorption was achievable in practice. The removal of HCN before the purifiers would have a most beneficial effect but it was not very practical, in fact a 'complete humbug.'

He thought that for the best use of sample tubes, a battery purifier would be an improvement. Gas could be more easily circulated and there could be small traction zones. With mechanical operation and oxide handling this would be perfectly practical.

As regards the maximum oxide lay depth, he thought that on a 24 hour operation period, this would be 36 in.

Mr. A. J. Gamper (Wandsworth), said that because of the interference by cyanogen with iodine testing, determinations of sulphurated hydrogen had been carried out for the past 20 years at the Wandsworth works by means of cadmium acetate.

Enlarging on Mr. Jordan's remarks he thought that it had been decided that the 'B' set tower purifiers at Wandsworth works should be operated for a period of not less than 12 months at their rated capacity of 10 mill. cu.ft. per day. This test had been in progress since the beginning of April this year and no undue difficulties had been encountered. The gas treated had, mainly, been coal gas with an average sulphur content of 460 grains per 100 cu.ft. The new purifying material had been artificial oxide equal to a bog-lux mixture in activity and had been worked up in two foulings. The change had normally taken place when the first taker activity had dropped to 30%. The average daily gain in sulphur content of a tower in first taker position had been of the order of 2.2 tons and the average sulphur content for the purifier unit as a whole had been maintained at just over 30%.

He paid tribute to the courage of Colonel Croft, in deciding to install Tyssen-Lentz tower purifiers at Wandsworth Works in 1938, at a time when they were operating in Germany under very different conditions from those which had applied at Wandsworth. In 20 years experience they had found that this plant was easy to control and gave the minimum of trouble.

He thanked Mr. Cope for a most stimulating paper which had provoked a most useful discussion.

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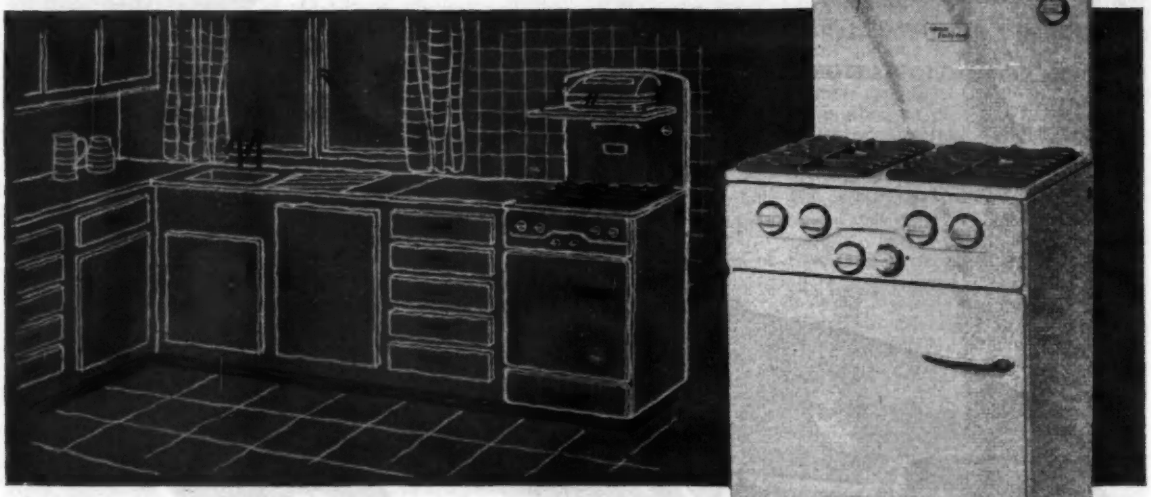

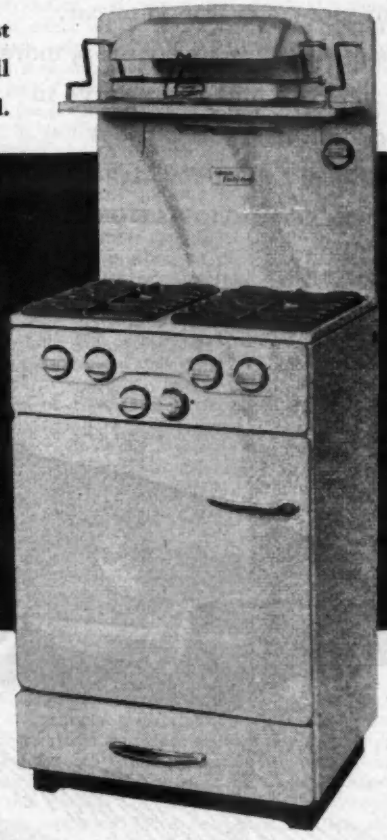

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The Importance to Sales of Quality and Consistency*

Discussion on the paper by J. W. Rodgers to the Manchester District Junior Association of Gas Engineers

Mr. T. Nicklin (Production Engineer, North Western Gas Board) thought that what Mr. Rodgers had said about the impurities in gas, gum, ammonia, etc., was partly true. They were there and something could be done about them. It was agreed that sulphur must go and it should have gone a long time ago, but where it had been removed the cost of its elimination had not yet been really justified by increased sales.

Mr. Nicklin said he did not agree with Mr. Rodgers when he said that a good salesman does not complain about the price of his commodity. The objective on the production and distribution side of the industry was to reduce the price of the commodity and how that price compared with its competitors, electricity and oil, was probably the greater factor in the future of sales.

The **President,** Mr. J. K. Lord, said it would seem that neither electricity nor gas had made much progress in sales over the last few years. He felt this was due to the fact that the 'gas only' appliance was against us, and that sales organisation had succeeded less in the gas industry than in the electricity industry, possibly on account of salesmanship, since the costs in both cases were very similar. He wondered if the market survey had given any figures to show how many people had a gas ring installed with an electric cooker. In order to try and prove whether it was the salesmanship or the fuel which was at fault, would it be possible to select a self-contained, smallish area of supply, put in coke fires and distribute gas which was free from sulphur and other impurities, and send the sales organisation to the area and see what they could do?

Mr. Rodgers said that Mr. Nicklin was right in taking him to task about the price of gas—he had probably read more into his words than had been intended. Because the sales people accepted the price it did not mean they were satisfied with it. Regarding gas kettles and electric cookers, Mr. Rodgers asked Mr. H. G. Berrisford (Senior Assistant Statistician, N.W.G.B.) to answer this.

Mr. Berrisford felt the number would be very small. The people who used these gas rings usually used them in conjunction with other gas appliances; very few used them with electrical appliances, such as the cooker.

Mr. K. Summersgill (Deputy Distribution Engineer, N.W.G.B.), referring to market research, said that one important thing missing from the figures given was the number of consumers who had given up gas and the reasons why they had done so. These figures would prove valuable in a few years' time when another market survey was carried out, because it was change that mattered.

Dust Troubles

Referring to the Allen Taylor machines and the dust troubles in meters, which Mr. Rodgers said were increasing, was this because the gas was improving, i.e., contained less naphthalene and tar? In drying out the mains, was more and more of this deposit being passed forward? This could only be proved if there were figures to show that meter troubles were more frequent now than during the period before the Allen Taylor machines were used. That would prove whether or not these machines were justified. He suggested that the force pump was wrong and he favoured the Allen Taylor machine. Speaking from memory, for the eleven months ended March, 1950, about 144,000 services were cleared by force pumps, before the Allen Taylor machines came into use. In 38% of these the ground had to be opened up to clear the services. At March 31, 1957, this figure had been reduced to 62,000 and in only 18% of the cases had the ground to be opened up. This, he felt, justified the use of the Allen Taylor machines.

Mr. W. F. S. Howell (Manchester Industrial Engineer) agreed that sulphur should go and thought that whatever the extra expenses were in doing this, probably about 1d. per therm, it would be more than worth the extra charge which would have to be made. There would be such benefits as reduced maintenance, the use of cheaper appliances, the correct use of flueless appliances, and probably fewer complaints about fumes in the kitchen preventing the growing of plants. Another thing causing great concern was condensation which caused rapid deterioration of asbestos cement. Cases had been reported of condensation occurring where central heating boilers were connected to solid brick flues, and in some case walls had collapsed.

Well Worth Extra Penny

As far as industrial gas was concerned, there were many industries where the effect of sulphur was of importance, such as glass and certain processes in the non-ferrous metal industry, and where gas without sulphur would be worth the extra penny per therm. Probably in 80-90% of industrial processes sulphur did not matter, but the price did, and many firms could not afford that extra penny. On the one hand it was felt that sulphur must go, and they should take steps to remove it; on the other hand, it was said that they could not afford it, and they were faced with trying to persuade industrialists to put in sulphur removal plants, many of whom would not agree to do so.

Mr. H. H. Thomas pointed out that they did not know to what extent the individual fitter could modify the air ratio or length of flame on a cooker; the fitter just took it as part of his job and the sales officer did not become aware of it. The consumer would maintain that the appliance worked better, but he did not know why. Probably the cooker was adjusted for a particular quality, the quality had changed, and when the fitter had come along he had found the modified conditions, put it right, and had not mentioned the fact. It made one wonder just what appliance performance some consumers would put up with. Economical design and distribution was the answer, but only if the gas was consistent in quality. He had discussed with Mr. Rodgers the question of a 1d. per unit versus 20d. per therm, but one could not really take the basic price per unit versus the basic price per gas therm, because with electricity there was a preliminary charge of about 4½d. per unit, and the average consumer was extremely lucky if he obtained his electricity at 1½d.; it was nearer 1.4d. in the majority of cases—25% more than Mr. Rodgers had claimed—and if worked out on the quarter the average bill would be around £6. The suggestion made for comparison was a little bit one-sided.

Mr. J. Wilson (Manchester) wondered why Mr. Rodgers had left out the fact that production and distribution people should not go out selling appliances. In every electrical shop, in every advertisement for electricity, it was said 'Use electricity, it is cheaper.' It did not say it was cleaner and, he suggested, it was far better to send out gas with sulphur in it and sell it rather than remove sulphur and not sell it.

Mr. H. Butters (Board Member, N.W.G.B.) said that it was a costly business to remove sulphur, and although many salesmen had said they preferred it, the Board had had to hold the price of gas. They all knew the advantages of sulphur-free gas; the Board were conscious of it, and it was possible that in the near future the development section would cater for sulphur and gum-free gas. The industry had survived and grown over the years. There was a slight reduction in sales at the moment, but it was not beyond the efforts of sales policy to pull back the load they had lost. Looking ahead, they had the opportunity of sulphur-free gas—and probably at the same price as now.

Mr. S. Ryder, Director and Chief Chemist, Stoves Ltd., said they were much concerned about the variation in gas characteristics. It became increasingly important as appliances became more scientific, and it was becoming increasingly difficult to meet the requirements of Watson House, and of Salford, without sacrificing efficiency. Mr. Rodgers had men-

* The paper was published in the October 16 issue of the GAS JOURNAL, p.150

tioned that appliances must now burn gas over a very wide range of 50-85 A.T.B. without adjustment, and this meant sacrificing about 3% of the thermal efficiency on a figure of, say, 50%. This meant that some 6% of the efficiency was being lost—equivalent to more than a penny per therm of gas cost, and from their point of view the position seemed to be getting worse.

Mr. Ryder said the South Eastern Board were rapidly producing large quantities of oil gas, the North Thames Board were using butane-air mixtures added to coal gas to meet peak load, but he did not know what the North Western Board was doing. These things might help to take a fraction of a penny off the price of the therm, but they might very well increase the cost to the consumer through lost efficiency by appreciably more than was being saved in production costs.

Mr. A. H. Barrington (Stretford) proposed a vote of thanks to Mr. Rodgers for his paper.

GAS ON THE CONTINENT

Dr. Ernst Terres

ON the occasion of his 70th birthday, Dr. Ernst Terres, delivered his farewell lecture to the Technical High School of Karlsruhe in January. The lecture is reported in full in **Das Gas- und Wasserfach** of March 29, 1957. Dr. Terres was born in Metz and after a bi-lingual education in Luxemburg, spent 46 years at the Universities of Karlsruhe, Brunswick, and Berlin, mainly as teacher and research worker in fuel technology.

His earliest work was in physical chemistry under Haber to which he added, by way of broadening his knowledge, work in organic chemistry under Roland Scholl particularly relating to synthetic dyes. This was followed by a short spell in industry after which he returned to Haber and thence to Bunte. Competition for chairs in technical chemistry was severe and pay was low. His work at that time was concerned with the products of combustion both in gas flames and the internal combustion engine when these became topical in the early years of the century due to the growing competition of electricity. He became interested in the utilisation of benzole as a fuel for the internal combustion engine, a development which led to that of the six-stroke engine in which he is still interested.

From 1911 onwards, Dr. Terres was engaged in the study of the new systems of coal carbonisation which were then coming into this field; the vertical retort, the vertical chamber oven, inclined and horizontal chamber ovens, together with the generation of fuel gases for these systems in integral and central producers of several types with the recovery of waste heat in regenerators and recuperators. At this time he was also engaged in the study of gas purification and the combustion characteristics of gas used in lighting and heating.

Dr. Terres' academic career was interrupted repeatedly by periods of work in industry. His interest continued to be directed to gas utilisation and particularly to the use in the internal combustion engine of gases derived from coal and lignite—to the limits of combustibility and explosibility of these in different proportions of air. During a period with the Didier Company he carried out much work on the theoretical basis, measurement, and calculation of coking temperature, heat transmission, the influence of coal properties on swelling, and coke quality and allied subjects. At the end of the 1920's, work on the utilisation of low grade coals containing over 20% ash in producers anticipated to some extent the development of the Winkler generator.

The synthetic production of ammonia had led to a complete revision of traditional gasworks and coke oven practice in the treatment of this by-product. During his period of teaching at the College of Technology at Brunswick from 1925, Dr. Terres continued his work on the economic production of ammonium sulphate and elemental sulphur in these processes.

For the last 25 years Dr. Terres' work has covered an ever-widening field including the thermal cracking of oils (as functions of pressure and temperature), solvents and lubricating oils, more exacting analyses of coal and coke, and work on the origin and constitution of coal.

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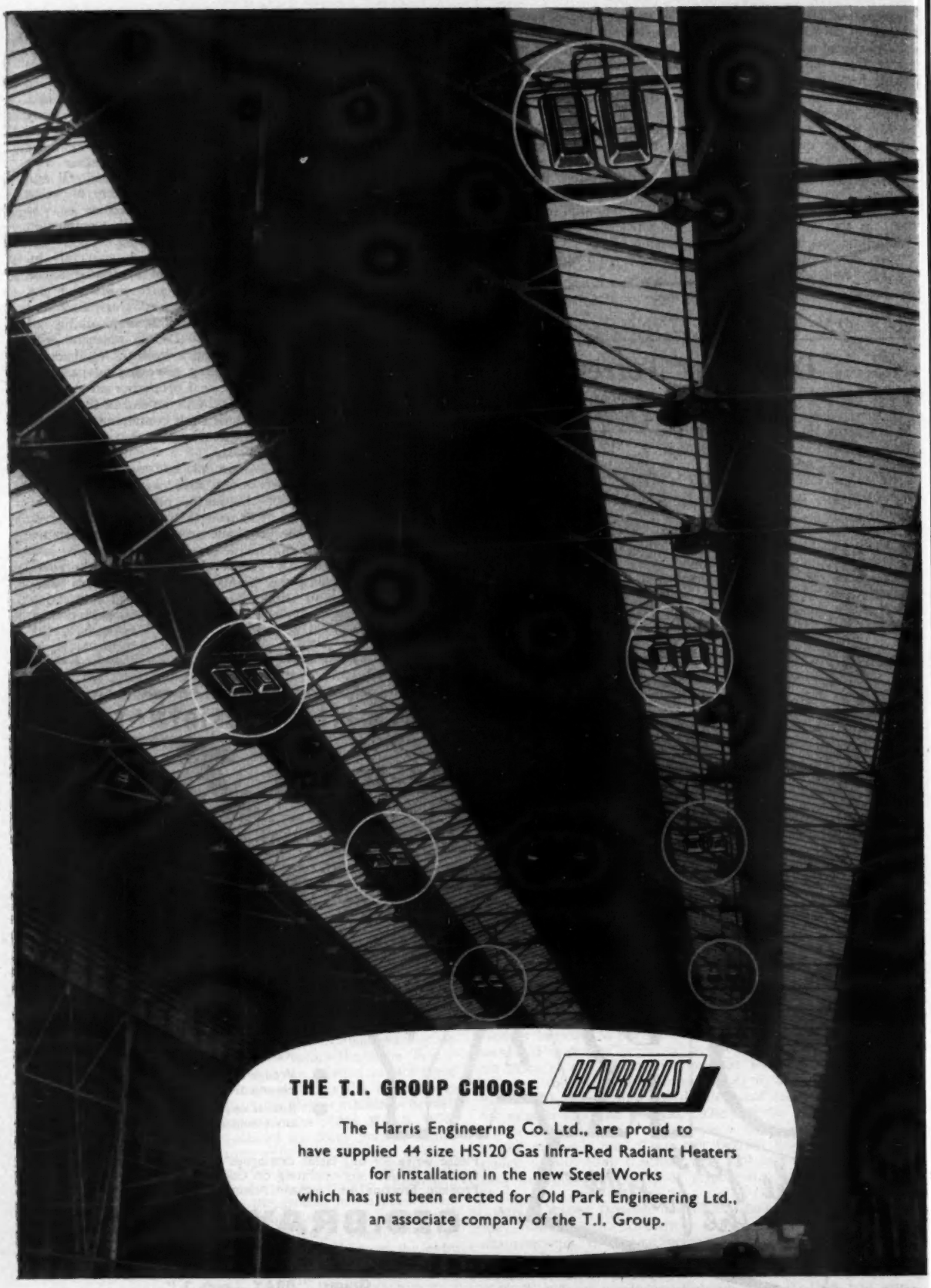
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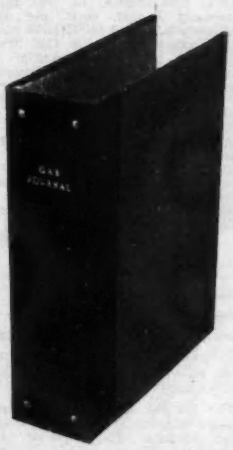

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SPECIAL OFFER: Large quantity of new cast iron fullway valves, all iron parts, 8 in., 10 in., 12 in and 14 in. for sale. The Midland Iron & Hardware Co. (Cradley Heath) Ltd., Cradley Heath, Staffs Tel.: Cradley Heath 6264 and 5.

UNUSED 48" Glenfield all iron sluice valves. 55½" flanges 2'-3½" long. Cleckheaton Engineering Co., Ltd., Cleckheaton, Yorks.

FOR Sale or for hire, Hudswell Clarke 0-6-0 Standard Gauge Steam Loco, in good condition, Apply, Eagre Construction Co., Ltd., Scunthorpe, Lincolnshire. 'Phone, 4513 (7 lines).

EDUCATIONAL

APPLICATIONS are invited for a Scholarship of £300 p.a. plus fees offered by the Gas Plant Industry for B.Sc. Honours course in Chemical Engineering. Further details from the Registrar, Imperial College, London, S.W.7. Applications must be received by December 20, 1957.

APPOINTMENTS VACANT

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
APPOINTMENT OF WORKS CHEMIST, SCUNTHORPE

APPLICATIONS for the above appointment are invited from persons who should be qualified to undertake all the usual tests applicable to the efficient control of a modern carbonizing and ancillary plant, and able to supervise the chemical duties of junior technical personnel.

The commencing salary will be within Grades A.P.T. 5/6/7 (£605/£785 p.a.) according to age, qualifications and experience.

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, and giving details of education, training and experience, together with the names of two referees, should be addressed to reach the undersigned by not later than December 2, 1957.

BERNARD CLARKE,
Divisional General Manager.

Belle Vue House,
Carline Road,
Lincoln.

November 16, 1957.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
FOREMAN MECHANICAL FITTER, TANNER STREET WORKS, NORTHAMPTON UNDERTAKING

APPLICATIONS are invited from qualified FITTERS for the post of Foreman Mechanical Fitter at Tanner Street Gasworks, Northampton. The applicant will be responsible to the Works Engineer or his deputy for the control and direction of several types of tradesmen and unskilled personnel engaged in the maintenance and repair of the plant. The Works comprises installations of continuous vertical retorts, catalytic oil gas plants, coal and coke handling plant, boosting and compressing plant and similar equipment associated with a modern Gasworks installation.

Applicants must have a sound background of workshop practice and experience, and preferably be conversant with the type of equipment referred to above.

The salary for this appointment will be within Grade A.P.T. 5 (£605/£685 per annum) of the National Salary Scales recently agreed by the National Joint Council for Gas Staffs, and all other conditions of service as laid down by the National Joint Council for Gas Staffs, the hours of work being 44 per week. The post is pensionable, and the successful applicant will be required to pass a medical examination.

A house, subject to Service Occupation Agreement, is available if required.

Applications giving full details of qualifications, training and experience, together with present post and salary and the names and addresses of two referees, should reach the Group Manager, East Midlands Gas Board, 45, Abington Street, Northampton, by not later than November 30, 1957.

H. B. TAYLOR,
Divisional General Manager.

Millstone Lane,
Leicester.

November 5, 1957.

EAST MIDLANDS GAS BOARD

SHEFFIELD AND ROTHERHAM DIVISION
ASSISTANT ENGINEER,
EFFINGHAM ST./DINNINGTON GAS WORKS

APPLICATIONS are invited from suitably qualified persons for the above vacancy in the Sheffield and Rotherham Division.

The salary for this position will be within Grades 7/9 (£705/£895) of the National Salary Scales for Gas Staffs. The duties of the post entail responsibility for the operation, under the control of the Works Engineer, of large carbonising, C.W.G., Oil Gas and ancillary plant installation.

Candidates should be Corporate Members of the Institution of Gas Engineers or hold an equivalent qualification and should have had experience in the operation of plants of the above types and preferably have had some experience in the control of labour.

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications, giving details of age, education and experience, together with the names and addresses of two referees, should be sent to the undersigned not later than Monday, December 2, 1957.

C. C. WOOD,
Divisional General Manager.

Commercial Street,
Sheffield, 1.

November 14, 1957.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
WELLINGBOROUGH GROUP
VACANCY FOR WORKING GASFITTER/DISTRICT GASFITTING FOREMAN, CORBY DISTRICT

APPLICATIONS are invited from fully qualified gasfitters for the position of WORKING GASFITTER/DISTRICT GASFITTING FOREMAN for the Corby district of the Wellingborough Group. The appointment will be in Intermediate Grade IV (salary range £525-£570) with Class 1 Conditions of Service.

The person appointed will assist with the improvement and consolidation of service to a rapidly expanding district with, at present, some 7,000 consumers. He will also be required to undertake certain standby duties, on a rota basis, in connection with grid reception/holder station, for which an appropriate payment will be made.

Applications stating age, qualifications, experience and present appointment, giving the names and addresses of two referees, should reach Mr. D. A. Foster, Group Manager, East Midlands Gas Board, Commercial Place, Wellingborough, Northants, within seven days of the publication of this advertisement.

H. B. TAYLOR,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.

EAST MIDLANDS GAS BOARD

NOTTS. & DERBY DIVISION
APPOINTMENT OF TECHNICAL ASSISTANT (GRID CONTROL), DIVISIONAL HEADQUARTERS, DERBY

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT (Grid Control) on the staff of the Divisional Engineer at Derby.

The successful applicant will be responsible for the supervision of the shift Grid Control Assistants and the day to day operation of the Divisional Gas Grid under the general supervision of the Assistant Divisional Engineer.

The minimum qualification required is the Higher Grade Certificate in gas manufacture; the possession of a qualification in distribution would be an advantage.

Applicants will also be expected to have a good all round knowledge of all types of gasworks plant as the appointment is concerned with general duties associated with technical and engineering matters at any of the works in the Division.

The appointment will be made initially in Grade A.P.T. 9 (£795/£895), but there will be scope for some further advancement dependent on the ability of the person appointed to assume greater responsibilities.

Applications stating age and giving details of education, qualifications, present position and experience, together with the names of two referees, should be submitted to the undersigned not later than Saturday, November 30, 1957.

K. L. PEARCE,
Divisional General Manager.

East Midlands Gas Board,
Notts. & Derby Division,
P.O. Box No. 62, Friar Gate,
Derby.

NORTHERN GAS BOARD

(BLYTH DIVISION)
ASSISTANT ENGINEER—BLYTH UNIT

APPLICATIONS are invited for the position of ASSISTANT ENGINEER of the Blyth Unit (productive capacity 3 mill. cu.ft. per day) at a salary within Grade A.P.T. 9 (£795/£895 per annum) of the National Salary Scales for Gas Staffs.

Applicants should be fully conversant with the operation and control of modern carbonising plant and ancillaries, and be Corporate Members of the Institution of Gas Engineers. Experience with West's Continuous Vertical Retorts, although not essential, would be considered an advantage.

The successful candidate will be required to pass a medical examination and to join the Board's Pension Scheme.

Applications, giving full details of training and experience, together with the names of two referees, should be sent to the undersigned by December 3.

J. E. MCMANUS,
Divisional General Manager.

Bridge Street,
Blyth.

November 15, 1957.

WEST MIDLANDS GAS BOARD

NORTH STAFFORDSHIRE DIVISION
SENIOR HOME SERVICE ADVISER, STOKE-ON-TRENT DISTRICT

CANDIDATES for the above position should have had extensive training in Domestic Science, with an appropriate diploma. The applicant should be capable of working independently, of conducting cookery and laundry demonstrations using gas appliances, and should also have had experience in Home Service work.

The salary will be within the range of Special Grade 6 (£531-£621 per annum) of the National Salary Scales.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, education, qualifications and experience, together with the names of two referees, should be sent to Mr. J. E. Stanier, Divisional General Manager, West Midlands Gas Board, Etruria Gas Works, Stoke-on-Trent, to reach him not later than November 30, 1957.

J. SWAN,
Secretary to the Board.

SOUTH WESTERN GAS BOARD

SENIOR MECHANISATION ASSISTANT SECRETARY AND ACCOUNTANT'S DEPARTMENT, BATH

APPLICATIONS are invited for the above- mentioned post in the Board's Central Accounting Department.

Salary range £945 to £1,195—commencing salary within this range according to experience and capability.

Candidates must have had an extensive practical experience in the application of punched card equipment to all branches of Accounting, and be capable of supervising a large, mainly female, staff.

The post offers first class experience in a large scale and rapidly developing Punched Card Installation serving the whole area of the Board, at present using Powers Samas 40 and 80 Column equipment with an Electronic Multiplying Punch, and planned shortly to use Powers Samas Programme Computers and Samastronic Tabulators.

The successful applicant will be required to pass a medical examination and to join the Board's Staff Pension Scheme unless he is otherwise ineligible in accordance with the Rules of the Scheme.

Applications, stating age, experience, present appointment and salary, together with the names of two referees, must reach the undersigned by December 9, 1957.

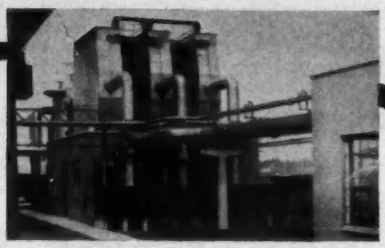
A. H. MORLAND,
Secretary and Accountant.

9a, Quiet Street,
Bath, Somerset.

November 12, 1957.

W. C. HOLMES AND COMPANY LTD. have vacancies on the staff for young CHEMICAL ENGINEERS. The posts offer interesting and varied work in a wide field of chemical engineering. Initially candidates will be engaged on commissioning of contract plants installed by the Company mainly in the gas and coking industries or on pilot plants. There are excellent prospects of promotion depending on the candidate's abilities, to Research, Design or Project Engineering. Candidates should possess a degree or diploma of a British University or equivalent in gas or chemical engineering or chemistry and should have satisfied their National Service commitments. Industrial experience is an advantage but not necessary. Candidates should apply, giving details of age, qualifications and experience to:

Mr. J. J. Priestley,
W. C. Holmes & Co. Ltd.
Research and Development Department.
Whitechapel Road,
Cleckheaton,
Yorkshire.



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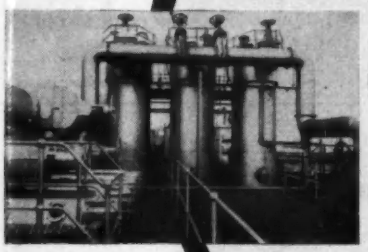

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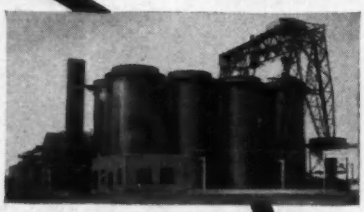

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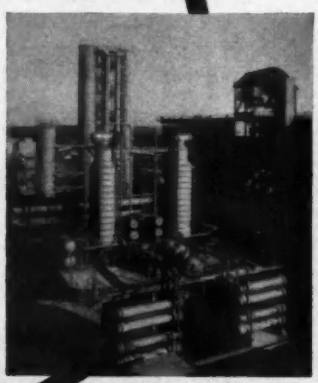
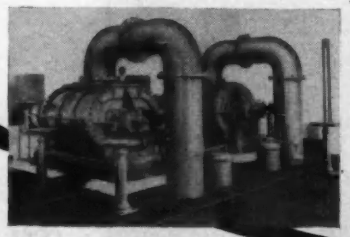


BENZOLE RECOVERY PLANT



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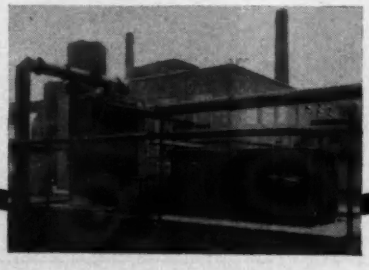

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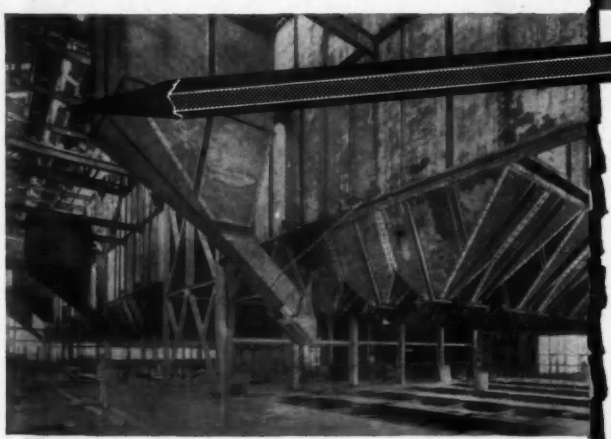

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PL 3

West's Shell Piling System is a unique method combining a precast shell with a cast-in-situ core. Bearing capacity of each pile can be calculated since the pile is driven to a predetermined "set" in the load-bearing stratum. This set is not disturbed and the firmness and rigidity of the positively driven pile are retained without core fatigue. A safe foundation is thus assured for the heaviest structure, even on poor or made-up ground.

Left:—ST. ALBANS. Foundation work for a new installation of 64 Glover-West continuous vertical retorts. 260 West's Shell Piles, 17½" dia., varying between 8 ft and 61 ft long, were driven to support the carbonizing and coal and coke handling plants. Loads carried are up to 60 tons per pile.
(Photo by courtesy of the Eastern Gas Board)

Right:—DENTON. Two of the retort benches and the mechanical producers in this installation of 160 Glover-West continuous vertical retorts are supported on West's Shell Piles, a total of 409 piles, 17½" dia., having been driven to depths varying between 15 ft and 30 ft.
(Photo by courtesy of the North Western Gas Board)

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France: - - - - - Compagnie Générale de Construction de Fours, Paris